

DARWIN'S NOTEBOOKS ON  
TRANSMUTATION OF SPECIES  
PART VI

PAGES EXCISED BY DARWIN

Edited by

SIR GAVIN DE BEER, M. J. ROWLANDS and B. M. SKRAMOVSKY

*Pp.* 129-176

BULLETIN OF  
THE BRITISH MUSEUM (NATURAL HISTORY)  
HISTORICAL SERIES

Vol. 3 No. 5

LONDON: 1967



THE BULLETIN OF THE BRITISH MUSEUM (NATURAL HISTORY), instituted in 1949, is issued in five series corresponding to the Departments of the Museum, and an Historical series.

Parts will appear at irregular intervals as they become ready. Volumes will contain about three or four hundred pages, and will not necessarily be completed within one calendar year.

In 1965 a separate supplementary series of longer papers was instituted, numbered serially for each Department.

This paper is Vol. 3, No. 5 of the Historical series. The abbreviated titles of periodicals cited follow those of the World List of Scientific Periodicals.

World List abbreviation :  
*Bull. Br. Mus. nat. Hist.* (Hist. ser.).

© Trustees of the British Museum (Natural History) 1967

TRUSTEES OF  
THE BRITISH MUSEUM (NATURAL HISTORY)

Issued 21 March, 1967

Price £1

# DARWIN'S NOTEBOOKS ON TRANSMUTATION OF SPECIES PART VI.

## PAGES EXCISED BY DARWIN

*Edited by*

SIR GAVIN DE BEER, M. J. ROWLANDS, & B. M. SKRAMOVSKY

### INTRODUCTION

It was explained in the Introduction to Darwin's First Notebook on Transmutation of Species, that his method of working, when preparing to write his large book on Natural Selection which never appeared, but of which the *Origin of Species* was an abstract, was to cut out of his Notebooks those pages which contained the material of which he felt most in need. The result was that the Notebooks themselves were mutilated; but it was found that, as they stood, they provided so much useful information on the way in which Darwin's thoughts flowed, and the dates on which he made certain notes, that they were published. About a year later, some of the excised pages were found, partly among papers which Sir Robin Darwin had deposited with the Science Museum and subsequently transferred temporarily to the British Museum (Natural History), and partly in the Museum's library. In this manner 28 pages were recovered, the notebooks to which they had belonged determined, transcribed, edited, and published.

On the death of Mr. Bernard Darwin, his son Sir Robin Darwin deposited temporarily at the Museum a box of papers in which were found 202 more of the missing pages, and these form the subject of the present publication. The number of pages still missing now stands at about 70, and of these some may have been blank. The probability of their being discovered is small, and it is probable that as much has been collected of Darwin's Notebooks on Transmutation of Species as ever will be: 824 pages.

These newly found pages were the ones which Darwin himself considered to be the most important for his work, and it would be impossible to comment on them. An exception must, however, be made, in drawing attention to the pages (III, 134 & 135) which make it possible to determine which passage it was in Malthus's *Essay on the Principle of Population* which provided Darwin with what he required to prove that natural selection forced favourable adaptive variants into their ecological

niches, to know the exact date when this struck him, and to read the immediate effect which this had in his mind and led him to draft his most striking definition of natural selection.

The different notebooks to which the pages originally belonged were identified by the late Mr. A. C. Townsend and one of us (B.M.S.) by comparing the scissor-marks on the pages and on the stumps left in the notebooks.

Darwin classified his excised pages and marked many of them with large figures scrawled in black or red pencil. A table of these is given.

The editorial policy adopted with the excised pages is the same as that used with the Notebooks, but simplified as much as possible. No attempt has been made at facsimile reproduction, and if a reader should require to know whether any particular word or phrase was written in ink or in pencil, and possibly at a later date than the body of the text, he must consult the original manuscript pages, which are now in the Cambridge University Library.

It is a pleasure to record indebtedness to Sir Robin Darwin, Mr. H. R. Creswick, Mr. P. J. Gautrey, and particularly to Dr. Sydney Smith who not only gave us the benefit of his Transcription of difficult readings of the text and pointed out many of our mistakes, but very kindly supplied us with the text of additional excised pages which he found in the Cambridge University Library.

TABLE OF NUMBERS MARKED IN PENCIL MADE BY DARWIN ON PAGES  
EXCISED FROM HIS NOTEBOOKS ON TRANSMUTATION OF SPECIES.

N.B. Some pages are marked with more than one number. They are all referred to here by the Notebook in Roman figures, followed by the manuscript page number in arabic figures.

*Number*

2. III. 114, 148.
3. II. 47, III. 12.
5. IV. 56.
7. II. 160, III. 102.
9. II. 253.
10. I. 190, II. 215, III. 54, IV. 124, 130, 170.
11. I. 70, 126, II. 71, 107, 110, 111, 142, 161, 185, 206, 222, III. 29, 55, IV. 25, 91.
16. III. 7, 136.
17. I. 30, 52, 189, II. 210, III. 31, 73, 85, 87, 105, 159, 173, IV. 123, 169.
18. I. 124, II. 23, 40, 94, 213, 227, IV. 139, 166.
19. I. 56, 154, 160, 177, 199, 201, 209, 234, 249, 255, II. 13, 18, 25, 27, 41, 50, 92, 109, 183, 205, 216, 225, 227, 249, 251, III. 31, 45, 61, 133, 151, IV. 10, 12, 19, 21, 42, 166, 173, 176.
20. I. 76, 107, 173, II. 93, 102, 148, 184, 238, 239, 241, 250, IV. 20, 104.
21. II. 257, IV. 88, 120.
22. IV. 6, 87, 126, 166
23. II. 50, 160, III. 148, IV. 56.

*Pages excised by Darwin from his First Notebook on Transmutation of Species*

I

29 ... not. —

Monad has not definite existence. —

There does appear some connection shortness of existence, in perfect species from many changes and base of branches being dead from which they bifurcated. — |

30 Type of Eocene with respect to Miocene of Europe?

Loudon. Journal of Nat History<sup>1</sup>. July 1837. Eyton of Hybrids propagating freely. |

51 the nearest species often come [from] very remote quarters. (N.B. if Plata Partridge or Orpheus was introduced into Chili in present state it might continue & thus two species be created) & live in same country. How in propagation of wolf & Dog.<sup>1A</sup> (because being believed same species) if they do not breed readily point in view. — ?whether highly domesticated animals like races of man. — |

52 M. Flourens.<sup>2</sup> Journal des Savants. April 1837. p. 243 it is said as well known fact that “serin avec le chardonneret, avec la linotte, avec le verdier” & for silver gold & common pheasants & fowls. — “on sait que le ‘métis’ du loup et du chien, que celui de la chèvre et du bœuf, cessent d’être féconds dès les premières générations” go back to type of either animal when crossed with it. — |

55 There certainly appears attempt in each dominant structure to accom[m]odate itself to as many situations as possible. — Why should we have in open country a ground woodpecker. — do. parrot. — a desert Kingfisher. — mountain tringas. — upland goose. — water chionis, water rat with land structures; carrion eagles. — This is but carrying on attempt at adaptation of each element. —

May this not be explained on principle of animal having come to island where it could increase, but there were causes to induce great change. like the Buzzard which has changed into Caracara at the Galapagos. law of chance would cause this to have happened in all but less in water birds. — |

56 Fernando Noronha *Ophyessa bilineata* (Gray) new species belonging to true American genus.

Waterhouse<sup>3</sup> says he is certain, that in insects, each family, however many there may be, represent every other, for instance in Heteromera, you have representatives (which at first would be mistaken for) Carabidae, Chrysomela, Scarabeidae, & Longicornes. —

<sup>1</sup> Thomas Campbell Eyton. “Some Remarks upon the Theory of Hybridity”. *Mag. Nat. Hist.*, N.S. vol. 1, 1837, p. 357: “a hybrid male and female, derived from the Chinese and common goose, had been productive *inter se*”

<sup>1A</sup> John Hunter, *Observations on certain parts of the Animal Oeconomy*, with notes by Richard Owen, London 1837, “Observations tending to show that the Wolf, Jackal and Dog are all of the same species”.

<sup>2</sup> Marie-Jean-Pierre Flourens. Review of Cuvier's *Recherches sur les ossements fossiles*, in *Journal des Savants*, avril 1837, p. 243.

<sup>3</sup> George Robert Waterhouse. “Description of some new species of exotic insects”, *Trans. Entom. Soc. Lond.*, vol. 2, pp. 188–196. On p. 189:—“This collection consists chiefly of Coleopterous insects, and among them I had most of the curious *forms* observed in the section *Heteromera*, — my object being to show that the species thus selected were analogous representations of other groups of beetles; that is to say, that they departed from their own group in certain characters of form, colour, &c., and that in these respects they appear to have borrowed (if I may use such a term) the characters of other groups of the same order, to which they bear such a resemblance that they might at first sight be mistaken for species belonging to those groups”.

Again taking a subdivision of Heteromera |

69 tendency to keep to one line.<sup>3A</sup> Dr. Smith<sup>4</sup> says very close species generally frequent slightly different localities, so that they become useful to know what is species. —  
70 In proof that structure is simple adaptation, armadilloes & | & Megatherium each with same kind of coat. — If we could tell, I do not doubt even colour hereditary in time and in space (Mem. Galapagos). Little wings of Apteryx. *Dacelo* & *Kingfisher* same colours |

75 relation of types in two countries direct relation to facilities of communication.

Have *races* of Plants ever been crossed really, if there is any difficulty in such marriages or offspring show tendency to go back — there is an end to species. — |

76 Brown<sup>5</sup> Appendix. A most remarkable observation of Mr Brown about peculiarities of Flora on East & West ends of New Holland. diminishing towards centre (p. 586) — Parallel 33°–35° some of forms reduce towards Northern Eastern end & die away & partake of Indian character. |

107 Ed. New. Philosoph. J. No. 3 p. 207 “It is not generally known that Ireland possesses varieties of the furze, broom, & yew very different from any found in great Britain. British varieties are also found in Ireland.”<sup>6</sup> — |

108 There must be progressive development; for instance none ? of the vertebrata could exist without plants & insects had been created; but on other hand creations of small animals must have gone on since from parasitical nature of insects & worms. — In abstract we may say that vegetables & most of insects could live without animals |

123 Race permanent, because every trifle hereditary, without some cause of change; yet such causes are most obscure without doubt: vide cattle: The grand fact is to establish whether in crossing very opposite races whether you would expect equal fertility. ditto in Plants. |

124 It will be well to refer to Chamisso<sup>7</sup> Vol. III, p. 155 about quantities of seeds in sea: also Holman<sup>8</sup>: Keeling these are most important facts. — As soon as island large enough for land birds, seeds picked from the beach by the birds: most seeds germinating. — |

125 It would be curious experiment to know whether soaking seeds in salt water &c has any tendency to form varieties?

<sup>3A</sup> Andrew Smith. “Observations relating to the Origin and History of the Bushmen”, *The South African Quarterly Journal*. No. 1, 1830, pp. 171–189.

<sup>4</sup> Andrew Smith. “A description of the birds inhabiting the South of Africa”, *S. Afr. Quart. Journ.*, No. 3, 1830, pp. 225–241; on p. 237:— “when a doubt can justly exist as to identity, to consider the objects, especially if their habitats be very far apart, as distinct species”.

<sup>5</sup> Robert Brown. Appendix No. III in *A Voyage to Terra Australis*, by Matthew Flinders, vol. 2, 1814, pp. 533–613; General Remarks, geographical and systematical, on the Botany of Terra Australis; p. 586:— “nearly half the Australian species of plants, at present known, have been collected in a parallel included between 33° and 35° latitude; and it appears from the preceding observations on the several natural orders, that a much greater proportion of the peculiarities of the Australian Flora exists in this, which I have therefore called the *principal parallel*. . . Within the tropic at least on the East coast, the departure from the Australian character is much more remarkable, and an assimilation nearer to that of India than of any other country takes place”.

<sup>6</sup> Robert Jameson, editor of *Edinburgh New Philosophical Journal*, vol. 2, 1826, Scientific Intelligence — Botany, p. 207:— “Irish Furze, Broom, and Yew”.

<sup>7</sup> Adelbert von Chamisso, in Otto von Kotzebue, *A Voyage of Discovery into the South Sea and Beering's Straits* . . . translated by H. E. Lloyd, London 1821.

<sup>8</sup> James Holman. *Voyage round the World*, London 1834.

Ed. N. Phil. J.<sup>9</sup> Moose found in Virginia p. 325 July 1828. Animal now confined to extreme North. — do p. 326 2 Fossil species of Ox in N. America<sup>10</sup>; as well as 2 recent. |

- 126 See Geol. Proc.<sup>11</sup> p. 569 1837. Account of wonderful fossils of India. Great monkeys<sup>12</sup> & p. 545.

Mr. Johnston<sup>13</sup> says Mag of Zooly & Bot p. 65 vol II talking of annelidae. — The fact is an additional illustration of that axiom in Natural History that all aberrant & osculant groups are not only few in species, but every two or three [in] them form genera

this is from unfavourable conditions there are many gaps & those forms which nevertheless have produced species, have |

- 153 See R.N.<sup>14</sup> p. 130 speculations on range of allied species. p. 127 p. 132. There is no more wonder in extinction of individuals than of species.

Paris Tertiary Shells in India!<sup>15</sup> ? A<sup>16</sup> p. 28

- 154 Dr Beck<sup>17</sup> & Lyell.<sup>18</sup> most curious law of species few in Arctic in proportion to genera. agrees with late production of those regions & consequently | not many get multiplied: N.B. How does this bear with law referred to by Richardson<sup>19</sup> in Report about each genus having its parent type in hotter parts of world.

Is monkey peculiar to C. de Verd Is.? No. Macleay<sup>20</sup> passage given in Congo Expedition.

We need not expect to find varieties intermediate between every species. — Who can find trace or history of species between |

<sup>9</sup> *Edinburgh New Philosoph. Journ.* vol. 5, 1828, p. 325, "Discovery of a fossil walrus or sea-horse, in Virginia.

<sup>10</sup> J. E. Dekay. "On a fossil ox from the Mississippi", *Edinburgh New Philosoph. Journ.*, vol. 5, 1828, p. 326.

<sup>11</sup> Sir Proby T. Cautley & Hugh Falconer. "On the remains of a fossil Monkey from the Tertiary strata of the Sewalik Hills in the north of Hindostan", *Proc. Geol. Soc.*, vol. 2, No 51, 1837, p. 568.

<sup>12</sup> Sir Proby T. Cautley & Dr Royle: in an extract from a letter in *Proc. Geol. Soc. Lond.* vol. 2, No. 51, p. 545 " . . . The animal must have been much larger than any existing monkey . . ."

<sup>13</sup> George Johnston. "Miscellanea Zoologica. The British Ariciadea". *Mag. Zool. Bot.* vol. 2, 18., p. 65:—"not only comparatively few species, but at the same time these species so dissimilar among themselves that each, or every two or three of them, will be found to have characters which are properly generic".

<sup>14</sup> Sir John Richardson. *Report on North American Zoology* (6th Report of the British Association for the Advancement of Science, 1836). An offprint was given by the author to Darwin and was heavily annotated by him; now in Cambridge University Library. Information kindly supplied by Dr Sydney Smith.

<sup>15</sup> Sir Charles Lyell. *Principles of Geology*, 5th ed. Loudon, 1837, vol. 3, p. 378-379:—"The Recent Strata form a common point of departure in all countries . . . Thus, for example, if strata should be discovered in India or South America, containing the same proportion of recent shells as are found in the Paris Basin, they also might be termed Eocene".

<sup>16</sup> Reference untraced.

<sup>17</sup> Heinrich Henrichsen Beck. "Notes on the Geology of Denmark", *Proc. Geol. Soc.* vol. 2, 1838, p. 217.

<sup>18</sup> Sir Charles Lyell. *Principles of Geology*, 5th ed., London 1837, vol. 3. See also Alexandre de Humboldt, *Dictionnaire des sciences naturelles*, Paris 1820, tome 18, p. 422; table: "Sur les lois que l'on observe dans la distribution des formes végétales".

<sup>19</sup> Sir John Richardson, *Report on North American Zoology*, (*Rep. Brit. Assoc. Adv. Sci.* [Bristol 1836] vol. 5, 1837, pp. 121-224.

<sup>20</sup> Reference uncertain. Capt. Tuckey's *Narrative of an expedition [to explore] The River Zaire usually called the Congo, in South Africa in 1816*. John Murray 1818. p. 36. "The only species here is the green monkey (*Cercopithecus sabaeus*)."

- 159 Von Buch<sup>21</sup> says from Humboldt<sup>22</sup> in Lapland genera to species 1.2, 3 — From Mackenzie<sup>23</sup> Iceland then 144 genera & 365 species of plants not cryptogamic 1.2, 53.—

In known varieties there is analogy to species & genera. — for instance three kinds of greyhound. — In plants do. the seeds of marked varieties produce no difference. if they do. — there probably will be this relation also. Yes. Fox.<sup>24</sup> |

- 160 The creative power seems to be checked when islands are near continent : compare Sicily & Galapagos!! —

Some of the animals peculiar to Mauritius are not found at Bourbon Zoolog. Proceedings<sup>25</sup> A.D. 1832 p. 111 |

- 173 Roxburgh<sup>27</sup> list of plants in Beatson's<sup>28</sup> St Helena — Galapagos — Juan Fernandez — Falkland Islds — Kerguelen land. — Phillips.<sup>29</sup> Lardner Encyclop. insists on analogy between Australia and fossils of Oolitic series. does not appear to me very strong. what is *Osteopora platycephalus*. (Harlan) found on Delaware is it Edentate? Phillips<sup>30</sup> Lardner p. 289 |

- 174 It is certain that North American fossils bear the closest relation to those now living in the sea. — See Rogers<sup>31</sup> report to Brit. Assoc. on *N. American Zoology* — |  
177 and milk — Fox<sup>32</sup> tells me that it is generally said. = = How came first species to go on. There *never* were any constant species. Both males & females lose desire.

Native dog not found in V. Diemen's land J. de Physique Tom 59 p. 467 Peron.<sup>33</sup> |

- 178 G. St Hilaire<sup>34</sup> has written "Opusculé entitled *Paleontographie*" developing his ideas on passage of forms. — Deshayes<sup>35</sup> states Lamarck<sup>36</sup> priority refers to introduction to *Animaux sans Vertebres* as latest authority — The case of the tailless cat of the Isle of Man mentioned in Loudon<sup>37</sup> analogue of Bloodhound. — |

<sup>21</sup> Leopold von Buch. *Description physique des Iles Canaries*, traduit de l'allemand par C. Bourgeois. Paris 1830. Proportion of genera to species : in North Africa 1 to 4.2 ; in Canary Islands 1 to 1.46 ; on St Helena 1 to 1.5. According to Humboldt, in France 1 to 5.7 ; in Lapland 1 to 2.3.

<sup>22</sup> Alexander von Humboldt. *De distributione geographica plantarum secundum coeli temperiem et altitudinem montium, prolegomena*, Lutetiae Parisiorum 1817.

<sup>23</sup> Sir George Stewart Mackenzie. *Travels in the Island of Iceland*, Edinburgh 1812, Chapter VIII, Botany, pp. 350-356.

<sup>24</sup> William Darwin Fox. Probably personal communication.

<sup>25</sup> Julien Desjardin. *Proc. Zool. Soc.* 1832, p. 111 :— " their animals are not universally the same, some species being met with in the one which never occur in the other ".

<sup>27</sup> William Roxburgh. List of Plants relative to the Island of St Helena, in Alexander Beatson, *vide infra.*, following footnote.

<sup>28</sup> Alexander Beatson. *Tracts relative to the Island of St Helena*, [London], 1816.

<sup>29</sup> John Philips. Treatise on Geology, in *Lardner's Cabinet Cyclopaedia*, London 1837.

<sup>30</sup> *ibid.*

<sup>31</sup> Henry Darwin Rogers. " Report on the Geology of North America ", *Rep. Brit. Assoc. Adv. Sci.* Edinburgh 1834 [1835], vol. 3, pp. 1-66.

<sup>32</sup> William Darwin Fox. Probably personal communication.

<sup>33</sup> François Péron, " Sur quelques faits zoologiques applicables à la théorie du globe, lu à la Classe des Sciences physiques et mathématiques de l'Institut National ". *Journ. de Physique, de Chimie, d'Histoire naturelle et des Arts*, tome 59, 1804, p. 463 ; Première section : observations zoologiques qui peuvent faire douter de la réunion primitive de la Nouvelle-Hollande à la Terre de Diemen. On p. 466 :— " Le chien . . . n'existe pas sur la Terre de Diemen ".

<sup>34</sup> Etienne Geoffroy-Saint-Hilaire. See following footnote. The basic idea is contained in his *Principes de philosophie zoologique*, Paris 1830, p. 214.

<sup>35</sup> Gérard-Paul Deshayes. *Bull. Soc. géol. France*, tome 4, 1833-4. p. 99 :— " M. Deshayes répondant à ce que M. Geoffroy-Saint-Hilaire a exposé dans la séance précédente en présentant son opusculé intitulé : *Paleontographie*, réclame en faveur de notre célèbre Lamarck la priorité de cette idée, que les animaux sont modifiés dans leur organisation par les circonstances ambiantes ".

<sup>36</sup> Jean-Baptiste de Lamarck. *Philosophie zoologique*, Paris 1809 ; also *Histoire naturelle des animaux sans vertèbres*, Paris 1815-1822.

<sup>37</sup> Edward Blyth. " An attempt to classify the ' Varieties ' of animals, with observations ", *Loudon's Mag. Nat. Hist.* vol. 8, 1835, p. 40. On p. 47 :— tailless cats . . . are other striking examples of *true varieties* ".

- 189 on hybrids between grouse & Pheasant.<sup>38</sup> Magazine Zoolog. & Botany vol. 1, p. 450.

There is in nature a real repulsion amounting to impossibility holds good in plants between all different forms ; therefore when from being put on island & fresh species made parents do not cross — we see it even in men ; thus possibility of Caffers & Hottentots coexisting proves this. — but when man makes variety then are vitiated. — this barely applies to plants |

- 190 Female pig apt to produce monsters in Isle of France.<sup>39</sup> — Madagascar oxen with hump.<sup>40</sup> — p. 173 Voyage par un Officier du Roi

Mem. Capt. Owen's<sup>41</sup> story of cats on West coast of Africa. — changing hair. The Edinburgh Journal of Natural History.<sup>42</sup> Preface appeared good with facts about changes when animals transported. |

- 199 Bustards in Germany. —

Athenaeum<sup>43</sup> No. 537 Feb. 1838 p. 107. Mr. Blyth states that all genera of birds in N. America & Europe, which have not their representative species in each other, are migratory species from warmer countries. When will this paper be published it will be curious. — Some general statement about mundine & confined genera. — |

- 200 Lyell<sup>44</sup> has remarked about no confined species in Sicily.

Jan. 1838 l'Institut.<sup>45</sup> Bats. in Eocene beds very like present species. p. 8? are mundine forms longest persistent ?? do. — The most perfect Plants Composit.<sup>46</sup> — !! *good those which have undergone most metamorphosis* is this applicable to insects &c. &c. ? — p. 23 do. — On animal—Confervae.<sup>47</sup> p. 23 |

<sup>38</sup> William Thompson. "On hybrids produced in a Wild state between the Black-Grouse (Tetrao tetrix) and Common Pheasant (Phasianus colchicus)", Mag. Zool. Bot., vol. 1, 1836-1837, p. 450.

<sup>39</sup> Jacques-Henri Bernardin de Saint-Pierre. *Voyage à l'Isle de France, à l'Isle de Bourbon, au Cap de Bonne-Espérance, &c., Avec des Observations nouvelles sur la nature & sur les Hommes, par un Officier du Roi*, Amsterdam 1773, tome 1, p. 247 :— "... celle du cochon ... La femelle de cet animal est sujette dans cette Isle à produire des monstres ".

<sup>40</sup> Bernardin de Saint-Pierre, op. cit., tome 1, p. 246 :— "des boeufs dont la race vient de Madagascar. Ils portent une grosse loupe sur leur cou ".

<sup>41</sup> William Fitzwilliam W. Owen. *Narrative of a Voyage to explore the shores of Africa, Arabia, and Madagascar* . . . London 1833.

<sup>42</sup> *Edinb. Journ. Nat. Hist.* No 2, 1835, p. 5 :— "We are astonished when we study their geological relation in any particular district or country ; their geographical distribution, relatively to the world itself, or their migration from one country to another ; their connection with climate, there being domestic plants, which follow man in his improvement and change of soil, or wanderers seeking to inhabit distant regions, formerly uninhabited by their kinds, or by their being social and living, like man, in large communities ; their abundance or rarity ; their mode of propagation ; their natural enemies, or more kindly friends."

<sup>43</sup> Edward Blyth. *Athenaeum*, No. 537, February 1838, p. 107 :— "... that those North American birds which have no generic representative in Europe, and those European genera which have no species proper to America are, almost without exception, migratory, belonging to types of forms characteristic of those regions where they pass the winter ".

<sup>44</sup> Sir Charles Lyell. *Principles of Geology*, 5th ed. London 1837, vol. 3, p. 444 :— "The newly emerged surface, therefore, must, during the modern zoological epoch, have been inhabited for the first time by the terrestrial plants and animals which now abound in Sicily . . . The plants of the flora of Sicily are common, almost without exception, to Italy or Africa, or some of the countries surrounding the Mediterranean ; so that we must suppose the greater part of them to have migrated from pre-existing lands ".

<sup>45</sup> Henri-Marie de Blainville. *L'Institut*, 1838, p. 6, Zoologie, Chauve-Souris. On p. 8 :— "ces familles existaient avant la formation des terrains tertiaires . . . si anciennes ne différaient que fort peu, si même elles différaient des espèces actuellement vivantes dans les mêmes contrées ".

<sup>46</sup> J. Meyen. *L'Institut*, tome 6, 1838, Physiologie végétale ; on p. 23 :— "M. Fries décide que les Composées sont les plantes les plus complètement développées ".

<sup>47</sup> *ibid.* "M. Mohl a fait connaître d'abord ses observations sur le Conferva ".

201 p. 267 Dela Bèche<sup>48</sup> Geolog. Researches. facts of salt-water shells living in absolutely fresh water. Origin of fresh-water genera? The absence of lime in Plutonic & Volcanic rocks most remarkable. — ? Have the changes been so slow, that all have existed for ages as metamorphic & therefore according to Lyell's<sup>49</sup> doctrine removed ?? |

202 Is the prevalence of Coniferous Woods before Dicotyledenous a fact analogous to reptiles before mammalia

Think about Miocene fossils some species being recent agreeing with Senegal. whilst Crag according to Beck<sup>50</sup> has none recent yet genera same. — Speculate on multiplication of species by travelling of Climates & the backward & forward introduction of species. — |

209 Bolivian human species<sup>51</sup>? —

Small new animal mentioned from Fernando Po.<sup>52</sup> Zoolog. Proceedings October (?) 1837 [Contrast New Zealand with Tasmania].<sup>52A</sup> The reason why there is not perfect *gradation* of change in species as physical changes are *gradual*; is this if after isolation (seed blown into desert or separation of mountain chains &c.) the species have not been *much* altered they will cross (perhaps more fertility & so make that sudden step. species or not. |

210 A plant submits to more individual change, (as some animals do more than others & cut off limbs & new ones are formed) but yet propagates varieties according to same law with animals ??

Why are species not formed during ascent of mountain or approach of desert? — because the crossing of species less altered prevents the complete adaptation which would ensue |

233 *Dr Smith's information.*<sup>53</sup> Long Horned (very) aboriginal at Cape crossed with English Bull. offspring very like common English. — Hottentots say great tailed sheep aboriginal at Cape & a thinner tailed kind farther inland. —

N.B. There is division of snakes with hinder teeth perforated for poison channels, but not having them. instance of useless structure.

Smith<sup>54</sup> thinks several species of Rhinoceros range from Abyssinia to extreme South coast. Elephant he believes is mentioned by old writers on extreme Northern

234 coast. | Hippopotamus do. — Giraffe do. —

<sup>48</sup> Sir Henry Thomas de La Bèche. *Researches in Theoretical Geology*, London 1834, p. 267 :— "*Voluta magnifica* is known to live high up in the brackish waters near Port Jackson in Australia, and an *Arca* inhabits the freshwater of Jumna, near Hamirpur, 1000 miles from the sea".

<sup>49</sup> Sir Charles Lyell. *Principles of Geology*, 5th ed. London 1837, vol. 3, p. 302 :— "The constant transfer, therefore, of carbonate of lime from the inferior parts of the earth's crust to its surface, must cause at all periods and throughout an indefinite succession of geological epochs, a preponderance of calcareous matter in the newer, as contrasted with the older formations".

<sup>50</sup> Heinrich Henrichsen Beck. "Notes on the Geology of Denmark", *Proc. Geol. Soc.*, vol. 2, 1835-1836, pp. 217-220.

<sup>51</sup> Joseph Barclay Pentland. "On the Ancient inhabitants of the Andes", *Rep. Brit. Assoc. Adv. Sci.*, 1834, p. 624 :— "The remains of this race are found in ancient tombs among the mountains of Peru and Bolivia".

<sup>52</sup> *Proc. Zool. Soc.*, vol. 5, 1837, p. 101 :— "Mr Martin exhibited a new Bat from Fernando Po". (Probably William Martin).

<sup>52A</sup> A pencil interpolation.

<sup>53</sup> Andrew Smith. Personal communication.

<sup>54</sup> Andrew Smith. *Illustrations of the Zoology of South Africa*. 1. Mammalia, London 1838, gives the range of the rhinoceros.

Range of East Indian Rhinoceros (?) — Some paper in Institut<sup>55</sup> on range of Bos in India. — Range of Zebra ? —

The crocodile & Tortoise former inhabits of Mauritius Freycinet<sup>56</sup> Voyage. agrees with *several mammalia* being peculiar (?)

If Henslow<sup>57</sup> discusses possibility of seeds of Keeling standing transport. — Get him to discuss those mentioned by Lesson<sup>58</sup> & Chamisso.<sup>59</sup> — |

249 Mr. Waterhouse<sup>60</sup> has most curious facts about the distribution of Lemurs in Madagascar, on neighbouring islets & a sub-genus in Southern Africa. In same manner, Cuscus, (a *sub* genus of Phalangista New Holland form) is found in many islands Celebes, Waygiou &c. &c. (See Lyell<sup>61</sup> Vol. III p. 30) different species in different isld. (as far East as New Ireland. See Coquille Voyage<sup>62</sup>). Waterhouse<sup>63</sup> remarks Australian Fauna so far. Indian all the rest. Timor according to mountain chain ought to be Australian ? — Mr. Gould<sup>64</sup> has been struck with similar extension of forms in Birds. — |

250 Waterhouse<sup>65</sup> thinks two main divisions of cats. Tortoise shell & grey — banded. ?species? thinks offspring of cats sometimes heterogenous. — Australian dog jumped into tub leaving only nose above it — pulled bell.<sup>66</sup> — It is most curious to observe, that all the species of mice in S. America which were hard to distinguish came from closely neighbouring localities. — Institut<sup>67</sup> 1838 p. 38 account of fossils of Sewalick India *Monkeys of old World* Crocodiles Anoplotherium. — |

255 T. Carlyle<sup>68</sup> saw with his own eyes new gate opening towards pigs. — latch on other side. — Pigs put legs over, & then with snout lift up latch & back. —

<sup>55</sup> reference untraced.

<sup>56</sup> Louis de Freycinet. *Voyage autour du monde . . .* Paris 1825–1839. Freycinet also edited the 2nd edition of François Péron's *Voyage de découvertes aux Terres Australes*, Paris 1824, referred to above by Darwin in connexion with Mauritius.

<sup>57</sup> John Stevens Henslow. "Flora Keelingensis. An Account of the native plants of the Keeling Islands", *Ann. Nat. Hist.* vol. 1, 1838, p. 337:—"Mr Darwin . . . presented me with the plants which he collected, together with his memoranda respecting them, I have thought that a list of the species, accompanied by a few remarks, might be of interest; and chiefly as serving to point out a set of plants whose seeds must be provided in a very eminent degree with the means of resisting the influence of sea water". It is interesting to note this early date at which Darwin was interested in the viability of seeds immersed in sea water, on which he made experiments twenty years later.

<sup>58</sup> René Primevère Lesson. In Louis Isidore Duperrey, *Voyage autour du Monde . . .* Paris 1826–1830, Zoologie is by Lesson and P. Garnot, tome 1, 1826.

<sup>59</sup> Adelbert von Chamisso. In Otto von Kotzebue, *A Voyage of Discovery into the South Sea and Beering's Straits*, London 1821.

<sup>60</sup> George Robert Waterhouse. Probably personal communication.

<sup>61</sup> Sir Charles Lyell. *Principles of Geology*, 5th ed. London 1837, vol. 3, p. 30:—"Phalangista vulpina inhabits both Sumatra and New Holland, the *P. ursina* is found in the island of Celebes; *P. chrysorrhoea* in the Moluccas; *P. maculata*, and *P. cavifrons*, in Banda and Amboyna".

<sup>62</sup> Louis Isidore Duperrey, *Voyage autour du Monde . . .* Zoologie par MM. Lesson et Garnot, tome 1, Paris 1826, p. 158:—"Couscous blanc, *Cuscus albus* . . . Kapoune des Nègres du Part-Praslin, à la Nouvelle-Irlande".

<sup>63</sup> George Robert Waterhouse. Probably personal communication.

<sup>64</sup> John Gould. *A Synopsis of the Birds of Australia and adjacent Islands*, London 1837–1838.

<sup>65</sup> George Robert Waterhouse. Probably personal communication.

<sup>66</sup> Reference untraced.

<sup>67</sup> Hugh Falconer & Sir Proby T. Cautley. "Sur de nouvelles espèces fossiles de l'Ordre de Quadrumanes", *L'Institut* tome 6, 1838, p. 37. Also *Proc. Geol. Soc.* vol. 2, 1837, p. 544:—"extract of a letter, dated Saharumpore 18th November 1836 . . . Captain Cautley and Dr Royle . . . of the finding of the remains of a quadrumanous animal in the Sewaliks, or Sub-Himalayan range of mountains. An Astragalus was first found, but latterly a nearly perfect head, with one side of the molars and one orbit nearly complete. The animal must have been much larger than any existing monkey, and allied to Cuvier's Cynocephaline group".

Frogs attempted to be introduced to isle of France.<sup>69</sup> p. 170 Fish introduced, Hump backed race of cows from Madagascar.<sup>70</sup> — p. 173 Vol. I. Voyage de France par un Officier du Roi. —

Mackenzie<sup>71</sup> Travel. p. 280 says cattle in Iceland are very like the largest of our highland sort, except in one respect, that those of Iceland are seldom seen with horns.  
256 p. 341 Black Fox sometimes introduced by ice<sup>72</sup> | very few pigs. — birds mentioned but few. — There was notice in Report of British Association of 1838 (Newcastle) about somebody who had made great collection of birds of Iceland.<sup>73</sup> — Mr. Gaimard,<sup>74</sup> however, will settle this. —

Waterhouse<sup>75</sup> says he is certain there are local varieties of colour & size but not forms (?) of animals. — He says Stephen<sup>76</sup> says he can at once tell by general colouring a group of *Nebria complanata* from Devonshire from another from Swansea. — Again Waterhouse<sup>77</sup> finds certain varieties of *Harpalus* common at Southend, but absent from near London. — Dr Smith,<sup>78</sup> he says, is deeply |

<sup>68</sup> Thomas Carlyle.

<sup>69</sup> Bernardin de Saint-Pierre. *Voyage à l'Isle de France* . . . Amsterdam 1773, tome 1, p. 170, fish and frogs introduced to Isle de France (= Mauritius).

<sup>70</sup> *ibid.* p. 246.

<sup>71</sup> Sir George Stewart Mackenzie. *Travels in the Island of Iceland* Edinburgh 1811, p. 280 :— "The cattle, in point of size and appearance, are very like our highland sort, except in one respect, that those of Iceland are seldom seen with horns".

<sup>72</sup> *ibid.*, p. 341 :— "Two distinct varieties of fox present themselves in Iceland: the arctic, or white fox (*Canis lagopus*), and one which is termed the blue fox (*Canis fuliginosus*) and varies considerably in the shades of its fur, from a light brownish or blueish grey . . . Horrebow mentions the black fox is sometimes brought over on the ice".

<sup>73</sup> John Hancock. "Remarks on the Greenland and Iceland Falcons" (Collectors: G. C. Atkinson & P. Procter), *Rep. Brit. Assoc. Adv. Sci.* vol. 7, 1839, p. 106.

<sup>74</sup> Paul Joseph Gaimard. Reference to work which ultimately appeared as "Liste des oiseaux qui se rencontrent en Islande avec des remarques sur leur présence dans cette île par M. Raoul Angles" in *Voyage en Islande et au Groenland* . . . Paris 1851. The voyage took place in 1834.

<sup>75</sup> George Robert Waterhouse. Probably personal communication.

<sup>76</sup> James Francis Stephens. *Zoological Journal*, vol. 1, 1825, p. 448, Art. 57, "Some observations on the British Tipulidae, together with descriptions of the Species of *Culex* and *Anopheles* found in Britain". A footnote on p. 451 refers to a collection of *Nebria* made in Devonshire by Dr William Elford Leach.

<sup>77</sup> George Robert Waterhouse. Probably personal communication.

<sup>78</sup> Andrew Smith.

*Pages excised from Darwin's Second Notebook*

II

- 13 Falkner<sup>1</sup> Patagonia no description of wild animals, nor in Dobritzhoffer<sup>2</sup> Abipones. —

Voyage de l'Astrolabe Zoologie<sup>3</sup> p. 60 Vol. I Cynocephalus niger comes from the Moluccas Matchian & Celebes. Amboina, Viverra Zibetha.<sup>4</sup> All the Moluccas, Waggiou, New Guinea, New Ireland, have phalangista<sup>5</sup> which differ in form & head & colour from those of New Holland. — The New Holland species are not found in the Archipelago. — Former statements to such effects false. In New Guinea a Kangaroo D'Aroe (Didelphus Bruni)<sup>6</sup> which as yet had only been found in isle of Aroe & Solor. |

- 14 likewise Vol. I new species of Parameles,<sup>7</sup> which joined to Casoars, perroquets, establishes its Zoolog alliance with New Holland. The Barbaroussas<sup>8</sup> (when young very like the Siam race with Long nozzle & few hairs) inhabits Celebes & few of the larger islands. — Antelope in Celebes. Bourou<sup>9</sup> new species of Aries Cervus moluccensis different from that of the Mariana islands & at Amboina. — I fancy there is marked wild breed of oxen at Java. p. 140 calls it Bos leucoprymnus.<sup>10</sup> does not say whether wild or not. p. 156 Parroket with stiff tail like woodpecker.<sup>11</sup> — |

- 17 The changes in species must be very slow owing to physical changes slow & offspring not picked. — as man do when making varieties. —

Voyage of Coquille.<sup>12</sup> Zoolog. p. 19 Tapir de Courrucous et rupicole vert instances of American forms in East. Ind. Archipelago. — Raffles,<sup>13</sup> Horsfield,<sup>14</sup> Diard,<sup>15</sup> Duvaucel,<sup>16</sup> Leschenault,<sup>17</sup> Kuhl,<sup>18</sup> Van-Hasselt,<sup>19</sup> Reinwardt,<sup>20</sup> Forrest<sup>21</sup> authors on E. Indian Arch.

Borneo & Sumatra both seem to have elephant & has oranges.<sup>22</sup> Tapir common to Sumatra & Molucca. Borneo & Molucca & Cochin China are said to have orange-

<sup>1</sup> Thomas Falkner. *A Description of Patagonia and the adjoining parts of South America*, Hereford, 1774.

<sup>2</sup> Martinus Dobritzhoffer, *Account of the Abipones*, London, 1822.

<sup>3</sup> Jean René Quoy et Joseph Paul Gaimard, *Voyage de découvertes de l'Astrolabe, Zoologie*, Paris, 1830, tome I, p. 60.

<sup>4</sup> *ibid.*, p. 61.

<sup>5</sup> *ibid.*, p. 62.

<sup>6</sup> *ibid.*, p. 62.

<sup>7</sup> *ibid.*, p. 62: "petit kangaroo à queue courte".

<sup>8</sup> *ibid.*, p. 63: "on les confond avec les petits cochons . . . de Siam".

<sup>9</sup> *ibid.*, p. 64: "à Java un boeuf remarquable par sa grande taille".

<sup>10</sup> *ibid.*, p. 140.

<sup>11</sup> *ibid.*, p. 156: "queue à plumes fortes et usée comme celles des Pics".

<sup>12</sup> René Primevère Lesson et Prosper Garnot, *Voyage autour du Monde . . . sur . . . La Coquille. Zoologie*, Paris, 1826, p. 19.

<sup>13</sup> Sir Thomas Stamford Raffles, *History of Java*, London, 1817.

<sup>14</sup> Thomas Horsfield, *Zoological Researches in Java and the neighbouring islands*, London, 1824.

<sup>15</sup> Diard is mentioned in the *Dictionnaire Larousse*, under "Duvaucel" as a French naturalist whom the latter met on his expedition, in 1818.

<sup>16</sup> Alfred Duvaucel (1792-1824).

<sup>17</sup> Jean Leschenault de la Tour (1773-1826).

<sup>18</sup> Heinrich Kuhl, in K. H. Blume, *Enumeratio plantarum Javae et insularum adjacentium*, Lugd. Batav. 1827-8.

<sup>19</sup> van Hasselt, collaborator with Heinrich Kuhl.

<sup>20</sup> Caspar Georg Carl Reinwardt.

<sup>21</sup> Thomas Forrest, *A Voyage to New Guinea and the Mollucas . . .*, London, 1779.

<sup>22</sup> Lesson et Garnot, *op. cit.*, p. 20: "Sumatra et Bornéo paraissent renfermer quelques espèces de quadrupèdes identiques, tels que l'éléphant des Indes, *Elephas indicus* Cuv. et les oranges".

- otang & Pongo in common.<sup>23</sup> Galiopithecus common to Moluccas & Pelew Is<sup>ds</sup>. p. 22 New Caledonia New Ireland p. 123 & Britain same kind of dog with those of New S. Wales. |
- 18 Crocodile at New Guinea. All the isles of Oceania have the Scincus with golden streaks. — the lacerta vitteli extends to from Amboina to New Ireland. p. 23 (Voyage of Coquille Lesson)
- no (p. 24) batrachian in isles of great Ocean says in conformity with Bory's<sup>23A</sup> Views. D'Orbigny<sup>23B</sup> is said to have brought a tortoise & toad from S. America & identical with those from S. Africa. M. Brissou<sup>23C</sup> doubts fact. — My toad is same species. |
- 23 p. 158 Cuscus albus.<sup>23D</sup> New Ireland. maculatus Waigiou. Speaking of Lepus Magellanicus says, "après un examen attentif, et forts surtout de l'opinion du baron Cuvier, nous ne balançons pas à le regarder comme une espèce distincte".<sup>23E</sup> p. 171 Sus papuensis partly domesticated like in general appearance the Siamese kind. — but considered good species from dental characters, wild pig said by Forrest to swim from one is<sup>ld</sup> to another.<sup>24</sup> — It is a good species. with different numbers of teats.<sup>24A</sup> (Coquille Voyage) |
- 24 Durville<sup>25</sup> has written Flora of Falkland Isl<sup>ds</sup>. where is it? All the Society isles have the same productions<sup>25A</sup> p. 293. is very strong about this Lesson insists much. — The (p. 296) Columba Kurukuru found in all Malaisia & oceania, offers many varieties in each place to puzzle naturalists. — p. 372 Bourous the Babyroussa ; a Cervus near Marianus new ; & some rats & mice. In Amboina only Cuscus & Babiroussa |
- 25 N.B. (Isl<sup>ds</sup> springing up more likely to have different species than those sinking. because arrival of any one plant might make condition in any one isl<sup>d</sup> different). — p. 414. dogs of New Zealand of large size, resemble chien-loup. — cross, black & white, ears short & straight — do not bark. p. 433 birds & bats have certainly travelled from East Indies Isl<sup>d</sup> as far as Oualan. — wide space of sea. The East of America would account for this. — (Coquille Voyage) Says no reptiles p. 460 & very doubtful whether any birds Except Dodo !! — in Mauritius |
- 26 Lesson & p. 620 Centropus (coucal) of Java & Philippines has variety at Madagascar, Calcutta & Sumatra, but I do not see how it is known that they are varieties & not species. — Vol. 1. 694. Kingfisher of Europe (Alcedo ispida) from Moluccas

<sup>23</sup> *ibid.*, " Bornéo recèle sans doute beaucoup d'animaux inconnus ; mais ceux qu'on y indique plus particulièrement, tels que l'orang-outan et le pongo, existent aussi, à ce qu'on assure, et dans la cochin-chine et sur la presqu'île de malacca ". Pongo is the name of the orang-utan, but it is found only in Borneo and Sumatra.

<sup>23A</sup> Jean-Baptiste Bory de St Vincent, *Voyage dans les quatre principales îles des Mers d'Afrique*, Paris, 1804.

<sup>23B</sup> Alcide Dessalines D'Orbigny.

<sup>23C</sup> Mathurin Jacques Brisson, author of *Regnum animale*, Parisii, 1756.

<sup>23D</sup> Lesson et Garnot, *op. cit.*

<sup>23E</sup> *ibid.*, p. 169.

<sup>24</sup> Thomas Forrest, *op. cit.*, p. 97.

<sup>24A</sup> Lesson et Garnot, *op. cit.*, p. 175.

<sup>25</sup> Jules-Sébastien-César Dumont d'Urville, " Flore des îles Malouines ", *Mémoires de la Société Linéenne de Paris*, tome 4, 1825.

<sup>25A</sup> Lesson et Garnot, *op. cit.*

scarcely differs at all from those of Europe, but beak rather sharper & rather longer in proportion, colour slightly different. Who can say whether species or varieties.

27 p. 708. *Columba Oceanica* (Less.) inhabits Caroline | isld (perhaps Philippines & perhaps Friendly Isles & Hebrids) is very closely allied to *C. muscadivora*, which lives in the Eastern Moluccas. New Guinea. — (Case of replacement). Coquille Voyage. The Casuary inhabits Ceram, Borneo & especially New Guinea (replaces Emeu) in North of New Holland. —

New Guinea scarcely differs more from Australia more than Van Diemen's land —

Vol. II p. 8 no snakes on isles of central Pacific. yet there appears to be one at Botouma from account of natives, & probably on Oualan. Mitchell<sup>26</sup> says snakes on Friendly isles. p. 50 LX Journal of Silliman. Study Silliman |

28 Vol. II p. 10 it seems that crocodile was washed on shore at one of the Pellew isls — killed a woman.<sup>27</sup> Chamisso<sup>28</sup> p. 189 Tome III Kotzebue. — p. 22 a Gecko on St. Helena.<sup>28A</sup> — one Gecko on Isle of France *Scincus multilineatus* (p. 45) Moluccas & New S. Wales. *Scincus cyanurus* p. 8 & p. 49 on all the Moluccas New Guinea & New Ireland & even Java & very common on Otaheite according to Quoy & Gaimard<sup>28B</sup> stated in note to p. 21 in Sandwich isld. & according to Chamisso on Radack isld. —

p. 69 Shark very generally distributed: Mem. of great geological age. Gastrobranchus only two species, one in Northern Hemisphere 2nd in southern. p. 71 *Chimera antarctica* caught Chile, Van Diemen's land & Cape of Good Hope. p. 44 of this Note Book.<sup>28C</sup> also the *Taeniatole austral* |

39 ? Europe has many species but not genera distinct from rest of world ???  
Lyells Principles must be abstracted & answered.

Much might be argued what is *not* cause of destruction of large quadrupeds. — common to these types of animals.

What reptiles coexisted with Palaeotherium in Paris quarries & at Binstead. Mem. recent crocodile with Palaeotherium in India — : connection with Latitudes ! ? |

40 Zoological Journal. — Vol. I p. 81 Capromys.<sup>29</sup> West Indian isld. p. 120 ref. Philosoph. Transacts 1823 (Read June 5) important paper by Dillwyn,<sup>30</sup> on replacement of Cephalopoda & Trachilidous Molluscs by each other in secondary & Tertiary periods. — p. 125 ref. to Phil. Transacts. (read November 20th) Paper by Jenner<sup>31</sup> on birds seen far at sea, migrations of species. greese [geese] killed in Newfoundland with crops full of maize. (get limits of latter from Barton. — swifts return after

<sup>26</sup> *American Journal of Science and Arts*, vol. 10, no. 1, 1825, Zoology, Art. VI, letter from Dr. Samuel L. Mitchell, of New York, to Dr. Godman of Philadelphia, p. 50: "circumstantial description of a two-headed serpent I received from one of the Feejee islands".

<sup>27</sup> Lesson et Garnot, *op. cit.*, tome 2, p. 10.

<sup>28</sup> Adelbert von Chamisso, in Otto von Kotzebue, *Voyage into the South Sea*, London 1821. From the volume and page numbers that he cited, Darwin appears to have used a French edition of this work.

<sup>28A</sup> Lesson et Garnot, *op. cit.*, tome 2, p. 22.

<sup>28B</sup> *ibid.*, tome 2, p. 21, where Quoy and Gaimard, and Chamisso, are quoted.

<sup>28C</sup> This page is still missing.

<sup>29</sup> Anselm Gaëtan Desmarests, "Abstract of a Memoir on a new genus of the order Rodentia, named *Capromys*", originally published in *Mémoires de la Société d'Histoire Naturelle*, Paris, tome 1, 1823.

<sup>30</sup> L. W. Dillwyn, "On fossil shells", originally published in *Phil. Trans. Roy. Soc.*, London vol. 113, 1823, p. 393.

<sup>31</sup> Edward Jenner, "Some observations on the migration of birds", originally published in *Phil. Trans. Roy. Soc.*, London, vol. 114, 1824, p. 11.

- years to nests. Vol. II p. 49 on the localities of certain parrots habitations India & Africa.<sup>32</sup> — N.B. Any monograph like Gould<sup>32A</sup> on Trogons worth studying. — |
- 41 Zoolog. Journal Vol. 2. p. 221 Horsfield<sup>33</sup> on two bears *very* close species inhabiting Borneo & Sumatra, differ only in form of white mark on breast : p. 234. — good case p. 526 (ref.) to Temminck<sup>34</sup> Monograph Mammal 4<sup>to</sup>, good facts about distribution of cats.
- Vol. III p. 233, states that the "Asseel Gayal (Bos Gayaeus) does not mix with the Gobbich or village Ga[y]al.<sup>35</sup> — ? is latter same species domesticated, strangely contradictory to Azaras fact of conduct of wild & tame horses. — p. 246 — *Gymnura* new genus of Mam. found in Sumatra.<sup>36</sup> p. 452 Append. to Denham Clapperton &c. on Mammalia<sup>37</sup> no doubt will all be included in Smiths Work<sup>37A</sup> |
- 42 do. Vol. IV p. 273 Macleay<sup>38</sup> on *Capromys*. 4 species probably in Cuba (p. 271 Viedo<sup>38A</sup> says American dogs silent. Mem. contrary assertion of Molina) (p. 277) probably another in Jamaica & perhaps one extant at Leeward Isles. p. 388 Reference to Rüppels Travels<sup>39</sup> (what language?) *Hyaena venatica* of Cape found in Desert of Korti & Steppes of Kordofan. p. 401. Admirable letter from Macleay to Bicheno much excellent detail & firm views about species.<sup>39A</sup> — MUST BE STUDIED : genera founded in nature |
- 47 Zoolog. Transact. Vol. I, p. 165. — "an account of the MANELESS lion of Guzerat by Capt. W. Smee.<sup>39B</sup> considered merely variety. — yet form of skull very slightly different. —
- Zoolog. T. V. I. p. 389 Owen<sup>40</sup> remarks on Entozoa. the organs of generation, afford the least certain indications of the perfection of species — ! How does this agree with grand fact of Marsupial low cerebral structure ?? — |
- 48 do. p. 390. All classes of *Acrita* exhibit lowest stages of animal organization, [" ] & are analogous to the earliest conditions of the higher classes during which the changes of the ovum or embryo succeeded each other with the greatest rapidity "<sup>40A</sup> — so
- <sup>32</sup> N. A. Vigors, "Sketches in ornithology : or observations on the leading affinities of some of the more exclusive groups of birds".
- <sup>32A</sup> John Gould, *Monograph of the Trogonidae*, London, 1835-8.
- <sup>33</sup> Thomas Horsfield, "Description of the *Helarctos euryphilus* ; exhibiting the Bear from the Island of Borneo, the type of a sub-genus of *Ursus*", *Zoological Journal*, vol. 2, p. 221.
- <sup>34</sup> Coenraad Jacob Temminck, *Monographies de mammalogie, ou descriptions de quelques genres de mammifères dont les espèces ont été observées dans les differens musées de l'Europe*, Paris & Leiden, 1827.
- <sup>35</sup> *Zoological Journal*, vol. 3, p. 233, Thomas Hardwick, "On the Bos gour of India".
- <sup>36</sup> Thomas Horsfield, "Notice of a new genus of Mammalia, found in Sumatra by Sir Thomas Raffles", *Zoological Journal*, vol. 3, p. 246.
- <sup>37</sup> Major N. Denham, Captain Clapperton & the late Dr Oudney. *Narrative of Travels and Discoveries in Northern and Central Africa in the years 1822, 1823 and 1824*, London, 1826. Appendix XXI "Zoology" by J. G. Children.
- <sup>37A</sup> Andrew Smith, *Illustrations of the Zoology of South Africa*, London, 1838-49.
- <sup>38</sup> William Sharp MacLeay, "Notes on the genus *Capromys* of Desmarest . . .", *Zoological Journal*, vol. 4, p. 273.
- <sup>38A</sup> Viedo referred to by MacLeay, *op. cit.*
- <sup>39</sup> Wilhelm Peter Eduard Simon Rüppell, *Atlas zu der Reise in nordlichen Africa*, . . . . *ibid.*, p. 388.
- <sup>39A</sup> "A Letter to J. E. Bicheno Esq. F.R.S., in examination of his Paper 'On Systems and Methods', in the Linnean Transactions. By W. S. MacLeay Esq", *ibid.*, p. 401.
- <sup>39B</sup> Walter Smee.
- <sup>40</sup> Richard Owen, "Remarks on the Entozoa, and on the structural difference existing among them : including suppositions for their distribution into other Classes", *Trans. Zool. Soc.* vol. 1, 1835, p. 387 ; on p. 389 : "With respect to generation, the organs of which function afford in their varieties the least certain indications of the relative perfection of the species".

we find species each class successively present modifications typical of succeeding classes & likewise those much higher in scale. So Owen actually believes in this view !!!!

49 p. 392. — except generation & digestion in Acrite Kingdom | all organs blended together & same organ when eliminated is often repeated. as mouths in Polypi. surely not correct view of Flustra or Ascidia. spicule in sponge. stomachs in infusoria, generation in each joint of Taenia worm.<sup>40B</sup> — formative energies easily expended & no one system developed—not surprising to find many forms in Acrita. — typical of other (surely rather parents). (N.B. These views must lead to spontaneous generation ??) This whole paper must be studied. — |

50 D'Orbigny.<sup>41</sup> Birds of prey are distributed in S. America like other forms, but those inhabiting 3<sup>d</sup> zone of height & 3<sup>d</sup> of latitude more commonly are the same species. instead of analogues. — in other classes this evidently relates to greater range of such forms. —

p. 56<sup>42</sup> Ornithological Part of Voyage of ???<sup>43</sup> A Urubu (with one leg) attended the distribution of food at the Mission of Mojos (over 20 leagues apart from each other. — this bird was .: well-known for its impudence. This excellent case of memory without association. |

71 Mr. Gould<sup>44</sup> says wherever any mark like red patch on wing of Furnarius, Synallaxis &c. sure to unite the birds into group. — it is same as Yarrell's<sup>45</sup> remark about rock Pigeons. — & the latter most important in obviating a great apparent difficulty — preservation of colouring, when form has changed. — Can be said that animals no notion of beauty. When does prefer most powerful buck |

72 Owen<sup>46</sup> talking of Plesiosaurus alludes to some structure in head which he says (evidently as an *exception*) can only be explained by direct adaptation to animals wants & not as change in typical structure ?!!

Whewell,<sup>47</sup> in comment few will dispute, says civilisation hereditary. i.e. instincts of wisdom like senses of savages virtue? (How come its [comes it] some convictions patriotic?) — but more especially the power of reasoning &c. &c. — |

91 Musalmans of the Peninsula, are, generally speaking a much fairer race than the Hindus in the same tracts & that in their appearance & manners they are as opposite as day & night : yet we know how remote the periods at which both left the land of their forefathers. — the first to escape the doctrine of Muhammad, the last to

<sup>40A</sup> Richard Owen, *ibid.*, p. 390 ; it is indeed remarkable to find Owen supporting the theory of parallelism in embryology and the scale of beings.

<sup>40B</sup> Richard Owen, *ibid.*, p. 392.

<sup>41</sup> Alcide D'Orbigny, "Observations on the Raptores of South America, Translated from 'Voyage dans l'Amérique Méridionale'," *Magazine of Zoology and Botany*, vol. 1, 1836-7, pp. 347-359. Darwin's reference is to p. 352.

<sup>42</sup> This page reference should read 36.

<sup>43</sup> *Voyage dans l'Amérique Méridionale*, . . . , . . . ; p. 36 : "La familiarité des urubus est extrême. Nous en avons vus, dans la province de Mojos, lors de distributions de viande faites aux Indiens, leur en enlever des morceaux, au moment même où ils venaient de la recevoir".

<sup>44</sup> John Gould ; he described *Furnarius* and *Synallaxis* in the *Zoology of the Voyage of the Beagle*, vol. 2, 1841.

<sup>45</sup> William Yarrell, probably personal communication.

<sup>46</sup> Richard Owen, "A description of a specimen of the Plesiosaurus macrocephalus, Conybeare, in the collection of Viscount Cole", [read 4 April 1838], *Trans. Roy. Geograph. Soc.*, vol. 5, 1840, p. 534.

<sup>47</sup> William Whewell, *The Bridgewater Treatises on the Power Wisdom and Goodness of God as manifested in the Creation*, Treatise III, London, 1836.

extend their dominion, armed alike with the Koran & the sword". quote Whewells Bridgewater Treatise (p. 26) about plants from Cape of Good Hope continuing for some time to flower at their own periods. — |

- 92 Arcana of Science & Art 1831. p. 160 account of Bulbous root from Mummy after 2000 years, germinating<sup>48</sup>!! — Henslow doubts?

Geographical Journal Vol. V p. 201 Wellsted Memoir on isl<sup>d</sup> of Socotra.<sup>49</sup> Cattle generally marked like those of the Alderney breed, but size not larger than those of Black cattle. not have hump like those from India & Arabia p. 202 sheep have not the enormous tails, which disfigure those of Arabia & Egypt. — Civets cats only wild animals on isl<sup>d</sup>. — Neither Hyænas, jackals, monkeys common to either coast

- 93 found here<sup>49A</sup> not even antelopes, though common on coast of Arabia | not even antelopes though common on islets off Arabian coast. — Vol. VI. p. 89. — Lieut. Wellsted<sup>50</sup> "on coast of Arabia between Ras Mohammed & Jeddah". sheep numerous "of the kinds one white with a black face, & similar to those brought from Abyssinia; the others dark brown with long clotted hair resembling that of goats".

Geograph. Journal Vol. VII. p. 216. Mr. Bennett<sup>51</sup> Voyage round world. 20 years have scarcely elapsed since the Guava introduced from Norfolk Isl<sup>d</sup> "& it now claims all the moist & fertile land of Tahiti, in spite | of every attempt to check its increase. The woodlands for miles in extent are composed solely of this shrub". — p. 229 carcases of birds drifting out to sea —

Vol. VII p. 325 Wild dogs<sup>52</sup> of Guayana always hunt in packs go all together colour reddish brown ears long. — like bull terrier. — Indian secured one as they always like to cross this breed p. 333. alludes to the Macusie breed no description given — |

- 101 A communication<sup>52A</sup> to Geograph. Soc. in February or March 1838 on soil in Siberia being frozen to 400 ft in depth (& Erman's<sup>52B</sup> suspicion that it is not 700) is applicable to metamorphosis theory suppose when rhinoceros lived mean temp 60° minus [?] then temp at depth of four hundred feet would be 60° + 6° (??) therefore 34° degrees of change have travelled that thickness in that period & no ways assisted by fluid currents which may take place in metamorphic action. — |

- 102 Geograph Journal vol. I p. 17 &c excellent sketch of plants of New Holland supplementary to Appendix to Flinders Voyage by Brown.<sup>52C</sup> — Great space seems to

<sup>48</sup> Arcana of Science & Art: or an Annual Register of useful Inventions and Improvements. London 1831. On p. 160 "Protraction of Vegetable Life in the dry State". "Mr. Houlton produced a bulbous root which was discovered in the hands of an Egyptian mummy, in which it probably had remained for two thousand years. It germinated on exposure to the atmosphere; when placed in earth it grew with great rapidity".

<sup>49</sup> Lieut. R. Wellsted, "Memoir on the Island of Socotra", *Journ. Roy. Geograph. Soc.* vol. 5, 1835, pp. 129-229.

<sup>49A</sup> From here to the end of the page added by Darwin in pencil after he had excised the page, to complete the sentence; hence the repetition on the next page.

<sup>50</sup> Lieut. R. Wellsted, "Observations on the coast of Arabia between Ras Mohammed and Jiddah", *Journ. Roy. Geograph. Soc.*, vol. 6, 1836, pp. 51-96.

<sup>51</sup> F. D. Bennett, "Extracts from the Journal of a Voyage round the Globe in the years 1833-36", *Journ. Roy. Geogr. Soc.*, vol. 7, 1837, pp. 210-29.

<sup>52</sup> R. H. Schuckburgh, "Diary of an Ascent of the River Berbice in British Guayana in 1836-7", *Journ. Roy. Geogr. Soc.*, vol. 7, 1837, pp. 302-50.

<sup>52A</sup> K. E. von Baer, "On the ground ice or frozen soil of Siberia", *Journ. Roy. Geogr. Soc.*, vol. 8, 1838, p. 212; "Recent intelligence upon the frozen ground in Siberia", *ibid.*, p. 401.

<sup>52B</sup> Adolph Erman, letter from, *Journ. Roy. Geograph. Soc.*, vol. 8, 1838, p. 214.

<sup>52C</sup> Robert Brown, "General view of the Botany of the vicinity of the Swan River", *Journ. Roy. Geograph. Soc.*, vol. 1, 1832, p. 17.

act per se as barrier — Mem. Tartary & China, both coasts of New Holland. Compare birds of Australia with plants, with this object in view.

The intimate relation of Life with laws of chemical combination, & the universality of latter render spontaneous generation not improbable. |

- 107 Fraser<sup>53</sup> remarked to me at Zoological Society, that you never find two similar groups of birds in two countries, without intermediate ones occurring in intermediate country — i.e. mundane groups. —

Waterhouse<sup>54</sup> tells me in insects there are many plenty of instances of insects of one tribe taking on structure (probably accompanied by habits) of other, thus in Chalcididous insects, which I brought from Australia, *probably* live in flower & have Elytra formed from development of some other part of body. — there are hemipterous insects having spiny legs & running quick & general appearance of blattae — |

108 other Hemiptera strikingly resemble Coleoptera. —

Donacia. some orthopterous insects & some third [?] have got thighs with same peculiar structure & habits of clinging to rushes similar. — The question which I more immediately want are there Heteromera which have habits & part structure like Cuculionidae. — Are there any Crysomelidae with similar habits. But the Horae Entomologicae will tell this. —

What peculiar conditions the Staphylinidae on St. Pauls Rock must be placed under. |

- 109 Gould<sup>55</sup> says most subgenera confined to continent, though we have seen species of subgenera scattered over it.

We have abundant instances of remarkable structures which as far as species is concerned superabundant. Showy [?] tail in cock peacock, widow bird. Birds of Paradise, Trogons. — the one feather in wing the curious feathers in tail of Edolius. Remarkable how small detail in structure prevail amongst the same species & subgenera in families. — thus the banded tarsi is common to all the Laniadae & Muscipidae of new World, but not found in Old World. — |

- 110 If in any well developed family (Gould says)<sup>56</sup> there is any marked colouring of plumage (as black & white bars on wings of Trogons or lengthened rump feathers) & one species has small band & others large, then he says from long experience you may be almost sure, that there exist intermediate species. — This is remarkable & would lead one to suppose that species in same group generally contemporary. This would lead one to expect that fossil forms would generally fill up genera & not species. which is not true with shells ??? It looks as if animals perished by error. [?] |

- 111 It is most wonderful how in every family of birds, even the most strongly marked, there is a preeminently aerial, formed for flight & great *movement* in the air, & likewise rasorial species & likewise perching (Gould),<sup>57</sup> but the latter is obvious because all are so. —

Thus in Hawks there is a swallow, both in structure & habits (it cannot be doubted

<sup>53</sup> unidentified.

<sup>54</sup> George Robert Waterhouse.

<sup>55</sup> John Gould; cf. *Proc. Zool. Soc.*, 1834, Part II, p. 14.

<sup>56</sup> cf. *ibid.*, p. 25.

<sup>57</sup> General statements to this effect are to be found in Gould's Introduction to *The Birds of Europe*, London, 1837, and in his *Monograph of the Trogonidae*, London, 1835-8.

- that if swallow perished hawks & milvulus &c would instantly fill up their place.) — Humming bird there is strongly marked variety in the Tyrannidae. — Milvulus. —
- 112 Even flying woodpeckers, with powerful wings, but | tail stiff. — swallow & goat-sucker likewise exaggerated. — There is one most remarkable connection between these aerial representatives of the different families. — that sexes have same plumage. — this is applicable to swallow-hawk, (this not the case in swallow ??? which is most wonderful of all? whether in most aerial of swallow) Milvulus. & still more wonderfully to the Humming bird, which is one instance of its whole family where female is not dull. — I must observe that this pre-eminent structure is not always applicable to same habits, though swallow hawk milvulus may catch insects on the
- 113 wing & pratancola (? connected | with Chionis), yet the Tropic bird, has very different habits, though pre-eminently belonging to this type. ?Humming bird? the woodpecker Gould says he believes does but also on fruit. —
- The Rasorial type is wonderfully shown in the long legged cuckoos with claw like lark (one in Australia is called swamp pheasant) goatsucker, parrots with claw like lark (N.B. The La jeune veuve parrot though so much on the ground has not this
- 114 structure, instance of habit going before structure.) — | even one Kingfisher Gould has seen with long tarsi. — ground woodpecker Secretary bird. — & Mellisuga Kingii very rasorial for type. — Now here I must observe these characters vary in degree in last instance hardly at all developed. not confined to one species, but generally small genus ? are there not many ground parrots ? are there not many ground woodpeckers ? —

In each division Gould thinks he can trace structure for insects & structure for vegetation. — |

- 115 In conservation in Museum I could not discover any other clear relations besides aerial, & terrestrial — How is it in water birds. — there are walking forms in water birds. — but no web forms in land birds. — Groups of very different value have their representatives, the rasorial may be observed even in Lessonia &c. &c.
- In relations of affinity all organs change together, in analogy certain parts perfect of typical structure certain parts changed |
- 116 Has S. Africa & Australia, & S. America very few forms in common, but each several with Europe & northern Asia, & Northern America. — may we not look at these Northern regions as the receptacles of the wanderers out of the rest of the world? — Will this not agree with Waterhouse<sup>58</sup> & mammalia. — We have clear indication |
- 141 have elapsed. — let these families take domestic animals with them they might be supposed to change & make genera of birds analogous. animals would be possessed by the different races of man, yet altogether different. — To make this case perfect, we must suppose men instead of mere colour & trifling form & lead on to become greatly changed in structure & even to certain degree in habits, yet we may have there analogies. — We must try [?] races of such men living in same country but
- 142 separated, now | if one or the other race had become eminently aquatic, (N.B. aquatic i.e. relation to element & not minding particular trades.) — then the second

<sup>58</sup> George Robert Waterhouse contributed the section on Mammalia in the *Zoology of the Voyage of the Beagle*, London, 1839, i.e., published after this note was written by Darwin.

race would not obtain a cast of washing men, but might have the preexisting race, thus the analogy would not in all cases be produced. but would depend on exclusion. —

The same characters which are analogical in a genus with respect to rest of its family as in ground cuckoos, is affinity with respect to species of each other, because we suppose all descended from same. — but if two original species, each became ground, then the relation of all the ground cuckoos would not be affinity, but the truth would never be discovered. |

147 The *quantity of life* on planet at different periods depends on relations of desert, open ocean, &c. This probably on long average equal quantity, 2° on relation of heat & cold, therefore probably fewer now than formerly. The *number of forms depends* on the external relations (a fixed quantity) & on subdivision of stations & diversity, this perhaps on long average equal. |

148 The Cocos & Mar on the Mahé islands, on the higher parts & only on those & the islets separated at high water, not other islands, nor on any other part of world, no other plants peculiar to these isl<sup>ds</sup>. Can not bear the least salt water. Nuts prodigiously heavy (when trees of such nature far apart, must have travelled by each tree dying & mountain torrents, but to crawl up an hill. thereby deaths !!) looks like subsidence on the islets |

161 examine structure of this bird & get account of habits.

My definition of species has nothing to do with hybridity, is simply, an instinctive impulse to keep separate. which no doubt be overcome, but until it is these animals are distinct species.

If any one is staggered at feathers & scales passing into each other let him look at wings & orbits of Penguin & then he will cease to doubt : Scales into Teeth in Bony Pike (Waterhouse) |

162 It would be curious to know whether variety could be transmitted more easily in those born without coitus, than with. Magazine of Zool. & Bot. Vol. II p. — Dr Johnston<sup>59</sup> on Entomostraca Daphnia produce young, capable of producing young many times & lay two sorts of eggs. one remaining through winter. Might be given as a hopeless difficulty, except as distinct creation. — Generation may be viewed as condensor. Must (on my theory) — supported by foetal lower developed forms. — (N.B. Waterhouse says of *affinity* of many insects may be told by their larvae) but the acts of condensing must alter method of generation. — Heaven knows how. — This reaction takes place in every organ. Hence method of generation is very good general character in those animals where much change has been added, as it speaks to amount of change only & not kind : insects, vertebrata — plants. at first classification on generation might appear convention |

183 Erasmus<sup>60</sup> says he has seen old stallion tempted to cover old mare by being shown young one. —

Many African monkeys in Fernando Po — no new *forms* only species!

No salamanders (D'Orbigny Rapport p. 11) in S. America so highly developed

<sup>59</sup> W. Baird, "The natural history of the British Entomostraca", *Magazine of Zoology and Botany*, vol. 2, 1837-8 ; on p. 406 : "it is ascertained that one single copulation is sufficient not only to fecundate the mother for her life, but all the female descendants for several successive generations". The reference to Johnston's is obscure.

<sup>60</sup> Erasmus Alvey Darwin, Darwin's elder brother.

in North.<sup>61</sup> — Ichthology of S. America more peculiar than its ornithology p. 12 do. excepting salmons.

L'Institut Sorex from Mauritius<sup>62</sup> p. 112 ; & paper on genus. |

184 Magazine of Zool. & Bot. Vol. I, p. 456 4 instances of hybrids between pheasant & Black fowl.<sup>63</sup> — use as argument possibly some few hybrids in nature. —

p. 473 Webb & Berthelot<sup>64</sup> must be studied on Canary islands.<sup>64A</sup> Endeavour to find out whether African forms (anyhow not Australian) on Peak. Did Creator make all new, yet forms like neighbouring continent.

Chapter ten translated by Hooker. — my theory explains this but no other will. St Helena (& flora of Galapagos ?) same condition Keeling Isld. shows when proper dampness seeds arise quick enough. Vegetation of Peak altogether original<sup>65</sup> owing to being oldest & having undergone change ? ? no near lofty country p. 475. N.B. This bears on fossils of Europe, those species which can migrate remaining constant in form, others altered much. these others will be plants & land animals & land shells — all in short. Extreme North = to peak of Tejde in relation to surrounding countries & present tropical count[ries] . . .

185 p. 564 an abstract of Mr. Swainsons<sup>66</sup> views which if abstract true are *wonderfully* absurd. —

p. 565 Scotch wild Cattle breed freely with the tame.<sup>67</sup> Vol. II Magazine of Zoology p. 56 Peregrine Falcon holds *birds* for some time alive ? therefore other species mice & only kills them when urged by hunger.<sup>68</sup> —

p. 65. Aberrant groups<sup>69</sup> few in numbers & vary much in character, divided into many small genera : circumstances not favourable to many species. same circumstances which by causing death makes the group aberrant |

186 When species rare we infer extermination when group few in number of kind. extermination. — New forms *made* through probably an infinite number of forms. — therefore an isolated form probably a remnant. — Pachydermata & Horses few forms & they are remnants. — Cephalopoda ditto. —

Mag. of Zool. & Bot. Vol. II p. 125. Allusion to abortive spiracles in Hemiptera.<sup>70</sup>

<sup>61</sup> Alcide D'Orbigny, *Voyage dans l'Amérique méridionale*, . . . . .

<sup>62</sup> L'Institut, avril 1838, p. 112, "Le *Sorex sonneratii* . . . deux exemplaires recueillis par les frères Verreaux dont l'un provient de Java et l'autre de l'île Maurice".

<sup>63</sup> William Thompson, "On hybrids produced in a wild state between the Black-Grouse (*Tetrao tetrix*) and common Pheasant (*Phasianus colchicus*)", *Magazine of Zoology and Botany*, vol. 1, 1837, p. 450.

<sup>64</sup> P. Barker Webb & S. Berthelot, *Magazine of Zoology and Botany*, vol. 1, 1837, p. 473 : "Aspect général de la végétation des îles Canaries" has been already well translated in Dr Hooker's Botanical Miscellany".

<sup>64A</sup> P. Barker-Webb & S. Berthelot, *Histoire naturelle des Îles Canaries*, Paris 1836.

<sup>65</sup> *Magazine of Zoology and Botany*, vol. 1, 1837, "Reviews and critical analysis (*Histoire naturelle des Îles Canaries*)", p. 475 : "The Peak itself, the "Teyda", the vegetation of these wild regions is found to be altogether original".

<sup>66</sup> *Magazine of Zoology and Botany*, vol. 1, 1837, pp. 545-66, "Dr Lardner's Cabinet Cyclopaedia. Natural History, 1. On the Geography and Classification of Animals. By W. S. Swainson".

<sup>67</sup> *ibid.*, p. 565, "We know, beside, that they breed freely with the common ox, and that the progeny produced from the cows is also productive".

<sup>68</sup> William Thompson, "Contributions to the Natural History of Ireland", *Magazine of Zoology and Botany*, vol. 2, 1837-8, pp. 42-57 ; on p. 53 : "still retaining its first victim, secured the second with its other foot, and bore both off together".

<sup>69</sup> G. Johnston, "Miscellanea Zoologica", *Magazine of Zoology and Botany*, vol. 2, 1837-8, pp. 63-73.

<sup>70</sup> John Obadiah Westwood, "Notes upon Sub-aquatic Insects, with the description of a new Genus of British Staphylinidae", *Magazine of Zoology and Botany*, vol. 2, 1837-8, pp. 124-132.

do. p. 160. Soft plumage of night jar like owls.<sup>71</sup> analogy in habits adaptation to nocturnal habits — to cats &c. — must be acquired by my theory else my theory not applicable |

- 205 L'Institut 1838 p. 128 Extraordinary genus Mesites bird from Madagascar uniting pigeons & gallinaceous birds & parrots.<sup>72</sup> — legs of pigeon perfect. — &c. &c. do. p. 136 Ichthyosaurus in the Chalk.<sup>73</sup>

Those who say philosophically to a certain extent, nothing but experience will tell us when group is true, — there are no genera if mammalia are adduced, say oh look to your fossils, now if extinction had gone, without creation this would have been fair, but to place all that ever have lived into one list is unfair (moreover what will become of the future creations, if the list is now perfect. — ) the creator so creates animals, it will be said, that although at any one there are gaps yet altogether he has created a perfect chain \*\*\* supra on next page |

- 206 It is a fact pregnant with SOMETHING? that intermediate species have generally perfect organs of two adjoining families & not *all* organs blending away. — do changes of habits affect particular organs. —

\*\*\*Hopeless work to systematist, who believed that all his divisions merely marked his own ignorance. The collector was plodding at making a series, which would render our knowledge a chaos : who will doubt this if series now existed from man to monad — though physiology would profit if the series were believed to pass into each other. —

Different classes keep to their types with different degrees of closeness — look how close birds ! look at Mammals. how wide. — therefore birds younger ???! or have not been exposed to so many contingencies ??? |

- 209 some of the Ostriches were to die, then they would appear isolated.

In my birds from S. Hemisphere there are some godwits which are close to European species. and the sexes of which vary in colour of plumage in same remarkable manner as European species = singular coincidence if distinct creation. — i.e. — a mere statement nothing is explained. — this is fact analogous to mocking thrush of Galapagos having tone of voice like S. American. —

Have not Ruffs & Reeves a remarkably varying plumage for wild birds — |

- 210 At Zoolog. Garden there is half Jackal & Scotch Terrier — certainly more like Jackal in *gait*, size, fur ; manner in which ears droop like dog in character, & manner of wagging tail habitual movement connected with mood. —

There is no progression in the development in instincts in the orders of insects, so is there none of reason in orders of mammals. — Mem. Elephants & dog. There is one living spirit prevalent over this world. (subject to certain contingencies of organic matter & chiefly heat), which assumes a multitude of forms each having acting principle according to subordinate laws. — There is one thinking sensible principle (intimately allied to one kind of |

<sup>71</sup> W. B. Clarke, " Observations on *Caprimulgus europaeus* (night-jar) ", *Magazine of Zoology and Botany*, vol. 2, 1837-8, pp. 158-63.

<sup>72</sup> M. Bernier, *L'Institut*, tome 6, 1838, p. 128 : " [Mesites] analogue par ses pattes au Pigeon plus qu'à aucun autre group. par ses ailes à la plupart des vrais Gallinacés ".

<sup>73</sup> A. Courcier, *L'Institut*, tome 6, 1838, p. 136 : " Présence de l'Ichthyosaure dans la craie ".

- 213 Major Mitchell<sup>74</sup> is not aware that Australian dogs ever hunt in company — marked difference with dogs of La Plata & Guyana — people will say not species. —

Organs of generation a capital character (Owen)<sup>75</sup> not for first & grandest division. but for one of very high order. not for vertebrata. but mammalia & reptiles &c.

Timor is connected with Australia — Map to King's<sup>76</sup> Australia — by a bank of soundings of which there appears to be one line in which greatest depth is not more than 60 F. & in the whole area 120 is greatest (about 200 miles distant). — directly beyond produced line of Timor 213. What productions Sandal Wood Isl<sup>d</sup>.? ought to agree with Java ?? |

- 214 Terrestrial Planariae assuming bright colours; good instance of colours dependent on localities. —

Hamilton will give an account in his Travels in Asia Minor of the domestic animals. At Angora Centre of Asia Minor are the fine haired goats, which it is said cannot be transported from their country. — the long-haired cats are supposed to come from there. — All the sheep are thick-tailed. The dogs called Persian greyhounds are Kurdish & come also from Asia Minor. — tail like setters. long ears — colours vary, but form constant. — |

- 215 These abortive organs in some males animals, mammae in man, capable of giving milk.

The females of some moths, like glowworm have rudimentary wings so nature can produce in sex what she does in species of Apterix.

This is important because if these abortive wings in the female are allowed to the fully organized wings of the male rendered abortive in the womb — if these apparently useless organs do indicate such origin, then we are bound to consider abortive organs of same tendency in species. this is capital & novel argument. — (there is paper by Yarrell<sup>77</sup> in Zoolog. Transactions & Hunter<sup>78</sup> on this subject). Are there any abortive organs in neuter bee, because if so as she can be converted into female, it will be splendid argument. Old female turning into cocks. abortive spurs growing. — |

- 216 Are there any abortive organs produced in domesticated animals. in plants I presume there are? get examples. — for instance where a tendril passes into a mere stump. — Shall abortive organs of very same kind in these cases, have plain meaning and none in other case!

Savigny<sup>79</sup> has shown same fundamental organs even in Haustellata & mandibulata. — !! Argument where general argument is extended from species to genera & classes.

p. 479. fragment of tusk & molar tooth of Hippopotamus from Madagascar<sup>80</sup> !!!!!  
Proceedings of Geol. Soc. Vol. I.

<sup>74</sup> Thomas Livingstone Mitchell, *Three expeditions into the Interior of Eastern Australia*, London, 1838.

<sup>75</sup> Richard Owen, "Remarks on the Entozoa", *Trans. Zool. Soc.* vol. 1, 1835, p. 387.

<sup>76</sup> Philip Parker King, *Survey of the Intertropical and West Coasts of Australia*, London, 1818–22.

<sup>77</sup> William Yarrell. Reference untraced.

<sup>78</sup> John Hunter, *Observations on certain parts of the Animal Oeconomy*, with notes by Richard Owen, London, 1837, pp. 422–66: "Observations on Bees".

<sup>79</sup> Marie-Jules-César de Savigny, ? *Mémoires sur les animaux sans vertèbres*, Paris, 1816.

<sup>80</sup> *Proc. Geol. Soc.*, vol. 1, 1833, p. 479, "A letter was afterwards read from Mr Telfair to Sir Alexander Johnson, accompanying a specimen of recent conglomerate rock from the island of Madagascar, containing fragments of a tusk and part of a molar tooth of a hippopotamus".

It is capable of demonstration that all animals have never at any one time formed chain, since if cretaceous period assumed, then some perished before. carboniferous some perished |

- 221 male glow worm knowing female good case of instinct. bees turning neuter into Queen. more wonderful case.

Dwight's<sup>81</sup> Travels in America, speaks of short-legged sheep, hereditary proceeding from an accident. New England farmer — useful could not leap fences : — Dr Lang<sup>82</sup> (quoted) on Polynesian nation p. 4. — do. p. 186 quote Burkhardt<sup>83</sup> to show black colour of certain Arabs. — N.B. avoid quoting these hackneyed cases. |

- 222 Mr. Edw. Blyth<sup>84</sup> does not believe in circular or linear arrangement. — Thinks passage very rare, in anatomical structure. — the passage between owls & hawks only external. intermediate groups often have full structure of one class & full of second — this class if analogous to petrel-grebe external appears to be a puzzle against my theory. —

If I be asked by what power the creator has added thought to so many animals of different types, I will confess my profound ignorance. — but seeing such passions acquired |

- 225 element of extreme difficulty in mundane geological chronology.

Annals of Natural History Vol. I ?? p. 318 some remarks on Bonaparte's<sup>85</sup> list of birds in Europe & N. America on closely allied species replacing each other. good to consult.

p. 326 wild ass extending over 90° of Long. & Col. Sykes<sup>86</sup> alludes to some other case of 180° & great diff. of Lat<sup>d</sup>.

p. 355. Echidna of Van Diemen's land & Australia different.<sup>87</sup> Temminck Fauna Japonica (??) 82 Mammalia<sup>88</sup>

p. 293 Phalangista<sup>89</sup> of Australia & Van Diemen's land diff. — |

<sup>81</sup> Timothy Dwight, *Travels in New England and New York*, London, 1823.

<sup>82</sup> John Dunmore Lang, *Origin and migrations of the Polynesian nation*, London, 1834.

<sup>83</sup> John Lewis Burkhardt, *Travels in Arabia*, London, 1829.

<sup>84</sup> Edward Blyth, "Observations on the various seasonal and other external changes which regularly take place in Birds, more particularly in those which occur in Britain; with Remarks on their great Importance in indicating the true Affinities of Species; and upon the Natural System of Arrangement", *Magazine of Natural History*, vol. 9, 1836 pp. 393-409; on p. 407: "[referring to those who] hold that every natural assemblage of species, great or small, forms part of some quinary circle. Now, I cannot but observe here . . . I should think that a due consideration of this first *binary* distribution must at once carry conviction of the mind, must be at once a most unanswerable argument against all quinary or similar doctrines . . ."

<sup>85</sup> Charles Louis Bonaparte, Prince of Musignano, "A geographical and comparative list of Birds of Europe and North America", *Annals of Natural History*, vol. 1, 1838, pp. 318-320.

<sup>86</sup> *Annals of Natural History*, vol. 1, 1838, p. 322, "Proceedings of Learned Societies . . . A Paper was read by Colonel Sykes, 'On the identity of the Wild Ass of Cutch and the Indus, with the Dzegettai (Equus hemionus of Pallas)'."

<sup>87</sup> *Annals of Natural History*, vol. 1, 1838, p. 335: "Miscellaneous". . . . On the two species of Echidna, by J. E. Gray. "Sir E. Home, in his paper in the *Phil. Trans.* for 1802, figured two specimens of this animal, and Cuvier (*Règne Animal*, vol. 1, p. 225) considered them as two species, naming the one *Echidna Hystrix*, and the other *E. setosa*; but most succeeding zoologists have regarded them as a single species . . . The *E. Hystrix*, Cuv. . . . came from the continent of New Holland, while *E. setosa*, Cuv. . . . is confined to Van Diemen's Land".

<sup>88</sup> *Annals of Natural History*, vol. 1, 1838, p. 335: "Miscellaneous" . . . "Zoology of Java". "Temminck, in the *Fauna Japonica*, states, that he knows 82 kinds of mammalia, 455 birds, and 90 species of amphibia, as inhabiting that Island, although the interior is almost entirely unknown".

<sup>89</sup> John Edward Gray, "A reply to Mr Ogilby's Communication to the *Annals of Natural History* respecting *Phalangista cookii*", *Annals of Natural History*, vol. 1, 1838, pp. 293-7.

- 226 Habits can only be used in classification as indication of structure (including brains & other organs difficult to analyse). will not this separate facts about abortive organs &c.

The doctrine of monsters<sup>90</sup> is preeminently worthy of study on the idea of those parts being most easily mortified which last produced — insane men in civilized countries — this is well worthy of investigation. |

- 227 Institut 1838 p. 174. Aperçu very good on insectivorous quadrupeds — geographical range very good. — Blainville<sup>91</sup>

Ovington's<sup>92</sup> voyage to Surat floating isl<sup>d</sup> off coast of Africa p. 69 with tall grass. p. 72 hairy sheep —

Edinburgh Transact Vol. IX p. 107 An Ascaris inhabits the eyes of horses in India in which it may be seen swimming about.<sup>93</sup>

A. Smith<sup>94</sup> is firmly believed in representation. certain birds in many families, & very often in number 55 will have long tail. — in raptorial birds, & tigers & sharks, being spotted & colours of little value |

- 228 Dr Smith<sup>95</sup> if black & white man crosses, children heterogenous, he feels sure of this, first offspring most like mother. — like dogs Smith knew chinese hairless dog & common spaniel crossed. — 3 puppies *perfectly* like chinese & 3 perfectly like spaniel even when grown up. — Are mules homogenous owing to no attempt to keep up offspring, are not half lion & tigers ditto. (see Griffith)<sup>96</sup> & half Muscovy ducks, black cock & pheasant see Jardine's Journal.<sup>97</sup> — consult on this point — pigs always go against this, without number of vertebra new acquisition, we must |

- 237 ∴ Those animals, which only propagate by scission can not alter much ? !

Mr. Brown showed me Bauer's<sup>98</sup> drawings of a curious plant where a tube consisting of pistils & stamens united into long organ, moved on being touched, so as to protect itself, one segment of the corolla being (probably) smaller to allow it to lie on one side. — but in other species, this segment is converted into hood which possesses power of movement & not the organ itself | How except by direct adaptation has such a change been effected. — the consciousness of the plant that this part must be protected however it may be effected. —

Prodromus Florae Norfolkicae. 1833 Steph. Endlicher<sup>99</sup> (He will give sketch of

<sup>90</sup> John Hunter, in Richard Owen, *Descriptive and illustrated Catalogue of the Physiological Series of Comparative Anatomy contained in the Museum of the Royal College of Surgeons in London*, London, 1833, vol. 1, p. iv.

<sup>91</sup> Henri-Marie de Blainville, *L'Institut*, tome 6, 1838, p. 174, Zoologie : Mammifères Insectivores.

<sup>92</sup> John Ovington, *Voyage to Surat* 1689, London, 1696.

<sup>93</sup> Alexander Kennedy, "Account of a non-descript Worm (the Ascaris pellucidus) found in the eyes of Horses in India", *Trans. Roy. Soc. Edinburgh*, vol. 9, 1823, p. 107.

<sup>94</sup> Andrew Smith, possibly personal communication.

<sup>95</sup> ditto ; cf. also Edward Blyth, "An attempt to classify the varieties of animals", *Magazine of Natural History*, vol. 8, 1835, pp. 40–53 ; on p. 52 : "The mixed offspring of different varieties of Man thus generally blends the character of each, though instances are not wanting of its entirely resembling . . . either one or the other of its parents".

<sup>96</sup> Edward Griffith, *The Animal Kingdom arranged in conformity with its organization, by the Baron Cuvier . . . with additional descriptions of all the species*, London, 1827.

<sup>97</sup> William Thompson, "On the hybrids produced in a Wild State between the Black-Grouse (*Tetrao tetrix*) and the Common Pheasant (*Phasianus colchicus*)", *Magazine of Zoology and Botany*, vol. 1, 1837, p. 450.

<sup>98</sup> Ferdinand Bauer, in Matthew Flinders, *A Voyage to Terra Australis*, London, 1814, vol. 2.

<sup>99</sup> Stephan Ladislaus Endlicher, *Prodromus Florae Norfolkicae ; sive catalogus stirpium quae in insula Norfolk annis 1805–5 a Ferdinando Bauer collectae . . . Vindobonae*, 1833.

botany of islands of south sea says so in preface. — Mr. Brown<sup>100</sup> says character of Flora N. Zealand & N. Caledonia with a dash of New Holland. same species as in  
 239 N. Zealand — Some species of Australian Genera | same (Palm & *Chorismium tenax*) as in New Zealand & Australia. some SPECIES of AUSTRALIAN GENERA .∴ good case. rather large flora (150 ?)

Mr. Brown did not observe scarcely any Australian character in Timor plants, yet it seems there may be Eucalyptus! — (Hostile fact)

Be cautious about Goulds<sup>101</sup> case of birds of Van Diemens land & Australia. — The wombat (Brown)<sup>102</sup> is found in Is<sup>d</sup> of Bass's Straits |

240 The common mushroom & other cryptogamic plants same in Australia & Europe.<sup>103</sup> — if creation be absolute theory, the creation must take place as when creator sees the means of transport fail. — otherwise no relation between means of transport & creation exists. — pool may have been created at many spots & since disseminated.

See Habits of Malay fowls<sup>104</sup> p. 5 (note) on some papers on instincts<sup>105</sup> |

241 L'Institut 1838 p. 184 Botany of Bonin<sup>106</sup> "grande analogie avec la Flore du Japon", some European & Sandwich species & some of Japan. I do not understand any new ones. — Memoir will be published St. Petersburg Academy Imperial. Paper read in 1837 semestre..

I suspect some valuable analogies might be drawn between habitual actions of plants when exciting cause is absent & memory of animals. — (surely in plants |  
 242 movements effects of irritability, though means injection of fluid different from contraction of fibre) — it is most remarkable habitual action in plants, it allows of any degree in lowest animals habitual action in intestines subject to sympathetic nerves —

The vividness of first memory in children or rather their memory. very remarkable — scenes in themselves accidental — my first thought of sea side — |

249 N.B. I met an old man who told me that the mules between canary birds & goldfinches differed considerably in their colour & appearance. Every now & then — short-tailed *cat* ?cut? has its offspring short tails/one born at Maer

Tuckeys Voyage<sup>107</sup> p. 36 "*Cercopithecus sabaeus*" said to be monkey of St Jago C de Verds; same as on coast of Africa. — Macleay tells me same thing. p. 55. 40 leagues from land several patches of reeds & trees.<sup>108</sup> p. 259. 120 ft in length.

<sup>100</sup> Robert Brown, in Matthew Flinders, *A Voyage to Terra Australis*, London, 1814, Appendix III; possibly also personal communication.

<sup>101</sup> John Gould, *Synopsis of the Birds of Australia and the adjacent islands*, London, 1837–8.

<sup>102</sup> *Proc. Zool. Soc.* 1836, p. 49, the wombat "was brought from one of the islands in Bass's Straits".

<sup>103</sup> Robert Brown, in Matthew Flinders, *Voyage to Terra Australis*, London, 1814, Appendix III, p. 539: "southern extremity of Van Diemen's Island, where the necessary conditions exist, the relative proportion of Cryptogamous plants is not materially different from that of the south of Europe".

<sup>104</sup> reference untraced.

<sup>105</sup> John Oliver French, "An inquiry respecting the true nature of instinct, . . ." *Zoological Journal*, vol. 1, 1825, pp. 1–3, 153–173, 346–366.

<sup>106</sup> Heinrich Gustav Bongard, *L'Institut*, tome 6, 1838, p. 184, "Mémoire sur la végétation des Iles de Bonin"; original in *Bull. Scient. Acad. Imp. Sci. Saint-Petersbourg*, tome 2, 1838, pp. 369–372.

<sup>107</sup> James Kingston Tuckey, *Narrative of an Expedition to explore the River Zaire, usually called the Congo* 1816 . . . , London, 1818.

<sup>108</sup> *ibid.*, p. 55, "When forty leagues from the land, several floating patches of reeds and trees passed us".

some branches of *Justicia* still growing passed us.<sup>109</sup> |

- 250 do. p. 243 (Professor Smith's Journal) on the heights of St. Jago found a *Euphorbia* so near *Piscatoria* as scarcely to be distinguished from it.<sup>110</sup> — & several old acquaintances which grow on the lower region of the Canary islands. — p. 250 admirable table of plants of St. Jago showing many common to Canary isl<sup>d</sup>, Europe, & St. Jago upper region, & some to Cape. — some proper well worth studying, with  
251 respect to forms. — | Study Appendix<sup>111</sup> to Tuckey's Expedition

Journal of the Academy of Natural Sciences of Philadelphia Vol. VII Part II 1837 accounts of the various hares some since discovered of N. America,<sup>112</sup> & of the shrews.

- Dr Bachman<sup>113</sup> told me that near Charleston ? three species near New York (600 miles N. ?) replaced by three other species. — Says all the hares West of Rocky Mountains have peculiar character in extreme length of ears & length of limbs, so  
252 that he first thought only one species. & all hares on East side have other | peculiar appearances. Now this is precisely the case with the mice of S. America with respect to the Cordillera. — Bachman has seen webbed shrew. case of adaptation. — (case of Squirrel from extreme north turning white like Hares ?) I never saw more beautiful adaptation for snow like snow shoes than feet & hind legs of these white hares, fitted for region of snow. — |

- 257 In Holme's History of Man at Maer,<sup>114</sup> it is said the Samoyed women (?North end of the Oural mountains) have black nipples to their breasts. —

L'Institut, 1838, p. 230 says the *Macrotherium* of Europe is between the anteater of Good Hope & those of S. America.<sup>115</sup> — Are not some of the Australian fossils intermediate between those of Van Diemen's land & Australia proper. — Irish Elk case of fossil geographical range. |

- 258 [blank]

<sup>109</sup> *ibid.*, p. 259, "120 feet in length and consisting of reeds resembling the *Donax*, and a species of *Agrostis*, among which were still growing some branches of *Justicia*". These notes show that Darwin was already concerned with the survival of land organisms in sea water.

<sup>110</sup> *ibid.*, p. 243, "I found at last an *Euphorbia*, that bore so near a resemblance to *piscatoria* as scarcely to be distinguished from it".

<sup>111</sup> *ibid.* Appendix V, p. 420, is by Robert Brown, "Observations, Systematical and Geographical on Professor Christian Smith's Collection of Plants from the Vicinity of the River Congo."

<sup>112</sup> John Bachman, "Observations on the different species of Hares (genus *Lepus*) inhabiting the United States and Canada", *Journ. Acad. Nat. Sci. Philadelphia*, vol. 7, 1837, p. 282.

<sup>113</sup> *ibid.*, p. 358; also personal communication.

<sup>114</sup> Henry Holme, Lord Kames, *Sketches of the History of Man*, London, 1774.

<sup>115</sup> Henri-Marie de Blainville, "Dépôt d'ossements fossiles de Sanson", *L'Institut*, tome 6, 1838, p. 230: "*Macrotherium*, qui démontre en Europe l'existence d'un genre intermédiaire au Pangoline et à l'*Orycteryx* d'Afrique et aux Fourmiliers d'Amérique".

*Pages excised from Third Notebook*

## III

- 5 W. D. Fox<sup>1</sup> has a cat which he bought in Portsmouth, said to come from coast of Guinea, — ears bare, skin black & wrinkled — fur short (tail cut off in progeny peculiar) limbs very long, eyes very large, very fierce to dogs. — otherwise habits not different; tone of voice perhaps rather different. Crossed with common cat, exact variety unknown, three kittens alike each other, partaking very closely of form of mother: more than of the common cat. — ([in pencil:] Ch IX Mongrels Hybrids)
- 6 Fox has *half* Persian cat which bred with unknown common house cat. — had four kittens. two appeared | so very like common cat, that they were killed & other two very closely resembled in form of tail, fur &c. to the half bred Persian. — Here then we have clear case of heterogenous offspring from one impregnation. ?is this one impregnation, or two impregnations one giving half character & other more of English, but the effect is the same. —
- 7 Fox thinks that when a *wild* animal is crossed with a | tame, offspring always takes most after wild. — i.e. that no domesticated ones have been so long as wild one under present form. — Fox has seen several cases of foxes and dogs crossed. offspring always more resembled foxes than dogs (mem Jackal in Zoolog. Gardens) He has seen in a show half wolf & half Esquimaux dog which appeared to be intermediate between two parents. — this is very interesting as Esquimaux dog approaches to species. Again he has seen several crosses between Esquimaux dog & common
- 8 dogs & Fox thinks they decidedly take | much more after Esquimaux. — this agrees perfectly with Yarrell<sup>2</sup> & no leading question was put. —
- Fox thinks half Lion & Tigers are exactly intermediate in character & kittens alike each other. —

Even in children of parents one sometimes resembles one parent & one another & are not exactly intermediate. — |

- 11 & another leader mare. — this stallion though eager to all other mares had been entirely broken from these mares, (though horsing every month) & worked in the same cart in loose chains, by being at first beaten from her, & always accustomed to her. — even parallel to brothers & sisters in mankind. —

The case of all blue eyed cats (Fox has seen repeated cases) being deaf curious case of correlation of imperfect structure. — |

- 12 Fox says in Lord Exeter's Park or in the Duke of Marlborough there is a breed of white-tailed squirrels, which form a marked *wild* variety. doubtful whether all are white. Fox says half Muscovy.

Fox says a settler near Swan river lost his two cows entirely, changed his residence a great many miles — yet one day a cow walked in, then disappeared, & three days afterwards came again, bringing with her the other & younger cow. — |

- 29 Mr. Blyth<sup>3</sup> remarked that greater difference in the 4 Struthionidae, than in many large orders of birds. The Emu & Cassowary closest. — Ostrich & Rhea closest. —

<sup>1</sup> William Darwin Fox, personal communication.

<sup>2</sup> William Yarrell; this and the following pages read like notes taken at a discussion meeting of the Zoological Society.

<sup>3</sup> Edward Blyth.

(& 2 Rheas still closer). — Mr. Blyth asked whether structure of pelvis &c was not adaptive structure, like little wings of Auk which does not make that bird a Penguin. — (i.e. whether relation in one point or many) Owen<sup>4</sup> answered that all characters might be considered as adaptative and that he did not see where the line could be drawn. — thus the most remarkable character in Apteryx, small respiratory system ;  
 30 even much smaller | than in other Struthios was adaption to little movement. — nocturnal crawling bird. — Wings reduced to rudiment. — clavicle scapula &c. strongly developed to aid in breathing. —

Animals from Hobart Town mentioned, it seems most of species from there now found in Australia. —

New species of Moschus characterized by Ogilby.<sup>5</sup> who observed that the young of this animal which is so anomalous among true deer yet is spotted like so many deer. — very curious like some facts of Mr. Blyth on birds. — |

31 Dr Bachman<sup>6</sup> tells me line of Rocky Mountains separates almost all Mammals of N. America & many birds, which however are most closely represented. — Thus the red breasted thrush is separated by one not differing except by black line. — A Bunting by one only differing by some permanent white streaks. — &c. &c.

Dr Bachman has crossed cock Guinea Fowl with Pea Hen. — offspring female,  
 32 yet so infertile never even in seven years produced even an egg. — | a most curious bird, did not seem to know itself, at last associated with the ducks. — most *strange voice* often in the night, like peacock. — tail as long as Pea hen. — about intermediate. — (In Zoolog. Garden there is hybrid of Penguin duck a variety of Muscovy with goose !!)

Dr Bachman regularly breeds in Carolina for his table Muscovy & common ducks — they are produced in full equal numbers with pure bred (just like common mules)  
 33 & lay many eggs but never produce inter se or with | parent species. — The hybrids do not vary (i.e. the hens all alike & cocks all alike) more than parent species. — Mr. Blyth remarked only near species or varieties produce heterogenous offsprings. — are not the hybrid pheasant & grouse different — (if so chinese pigs & common must be considered as distant species ?? or is time the varying element). Then do those *species* which breed most freely & produce somewhat fertile offspring produce heterogenous offspring.

It appears certain that hybrid Muscovy & common duck have been shot wild (escaped from Carolina)? off New York. therefore instincts not imperfect. Are Pheasant & Grouse homogenous? |

34 I observe Bachman calls these *Hybrids new species*.

Yarrell says the bird fanciers say the throw of any two species crossed is uncertain.

Yarrell remarks he has somewhere met conjecture that all salt-water [recte fresh water] fish were once salt water (as they almost must have been on elevation of continents) but Ogilby well answers that nearly all F.W. Fish are Abdominals ∴ that order first converted. — is it an old order geologically? |

<sup>4</sup> Richard Owen.

<sup>5</sup> William Ogilby.

<sup>6</sup> Rev. John Bachman.

53 will come from common stock. — all genera common stock — so that values can only be judged if in each separate line of descent. — & here limits of varieties being constant it would be exceedingly wrong to call one group genus & other subgenus. — Propagation best rule for genera, & so mount upwards, judged by analogy. — Consider all this.

N.B. How can local species as in Galapagos, be distinguished from temporal species as in two formations? by no way: — |

54 “Natura nihil agit frustra” as Sir Thomas Browne<sup>7</sup> says “is the only indisputable axiom in Philosophy Religio Medici Vol. II Sir T. Browne’s works p. 20.

“There are no grotesques in nature; not anything framed to fill up empty contours, & unnecessary spaces” p. 23 “for Nature is the act of God” — after Decandolles idea

Septemb 1. It has been argued man first civilized add this in note. ?mere conjecture? — Australians. — Americans &c. |

55 Septemb. 1. Macleay<sup>8</sup> & Broderip<sup>9</sup> when talking of some Crustacean, like Trilobite (Polirus??) female blind & quite different form from male with eyes! — (are not these differences in sex confined to annulosa?) remarked that young of Cirrhipedes can move & see, parents fixed, — young of sponges move. — young of Cochineal insects move about & see, parent female fixed & blind: — Macleay observed all these *facts* proves that *perfection* of organs have nothing to do with *perfection* of individual, though such relation seems common, but the perfection consists in being able to reproduce. |

56 Here there is some error — Observed, nature does nothing in vain, therefore organs fitted to animals place in creation. — thus senses, especially sight connected with locomotion. (Mem. Dr. Blackwell (Abercrombie)<sup>10</sup> comparison of sight to threads.) — Hence the *Pecten* which moves imperfectly has eye-point, but Broderip added it has been stated that stationary Spondylus has eye-points — Macleay then answered, because nature leaves vestiges of what she does — does not move per saltum — yet does nothing in vain!! |

61 Waterhouse knows three species of *Paradoxurus*<sup>11</sup> common to Van Diemen’s land & Australia. Well developed mammae in male ourang-outang other point of resemblance with man.

September 31<sup>d</sup> Magazine of Natural History<sup>12</sup> 1838 II p. 492. Mr. Gould<sup>13</sup> on Australian birds, all Eagles of Australia characterized by wedge tails, many of the hawks are analogous to European birds. also do. p. 403 & 404.

<sup>7</sup> Sir Thomas Browne, *Works*, edited by S. Wilkin, London, 1835-6.

<sup>8</sup> William Sharp MacLeay.

<sup>9</sup> William John Broderip (*cf. Life & Letters of Darwin*, 1887, vol. 1, p. 274).

<sup>10</sup> ? John Abercrombie, *Inquiries concerning the intellectual powers and the Investigation of Truth*, London, 1838.

<sup>11</sup> By “*Paradoxurus*” Darwin meant *Ornithorhynchus paradoxus*; personal communication from George Robert Waterhouse.

<sup>12</sup> Under the abbreviation “Magazine of Natural History”, Darwin has confused two different publications which, unfortunately, both published a volume 2 in 1838: they were, *Annals of Natural History or Magazine of Zoology, Botany and Geology*, and, *Magazine of Natural History*.

<sup>13</sup> John Gould, *Birds of Australia and the adjacent islands*, London, 1827-8. Neither journal mentioned in the previous footnote in vol. 2, p. 402 has a paper by Gould, but *Mag. Nat. Hist.* vol. 2, 1838, has, beginning on p. 399, a paper by Brehm, “Observations on some of the domestic instincts of Birds”; on pp. 402-4 there are references to birds of prey.

Vol. II do. (p. 71) allusion to Eyton's discovery of different number of vertebrae in Irish<sup>14</sup> & English hare. good case these hares compared to South American hares, many species separated by mountains &c &c &c |

- 62 do. p. 69, a Dr Macdonald<sup>15</sup> believes the Quaternary arrangement & not the Quinary. anyone may believe anything in such rigmarole about analogies & numbers.

L'Institut p. 275 (1838) Mr Blainville<sup>16</sup> has written paper to show Stonesfield Didelphis not Didelphis. answered satisfactorily by Valenciennes.

The change from caterpillar to butterfly is not more wonderful than the body of a man undergoing a constant round, each particle is placed in place of last by the ordering of the nerves, but in different parts according to age of individuals (see

- 63 mammae of women) in different parts when age | *changes* caterpillars into Butterfly. When two varieties of dog cross, Erasmus says it looks like . . . |

- 64 Institut 1837 p. 351 Paradoxurus Philippensis. Phillipines . . .<sup>17</sup> |

- 73 as at present in new Ireland & continent since grown. — This will explain S. American case of Didelphis being mundine form., & the less development of Marsupials in S. America. from presence of Edentata — Edentata & Marsupials have been almost destroyed wherever other animals existed. —

Athenaeum 1838. p. 654 Reason given for supposing Tetrao Rakkelhan a hybrid produced commonly in Nature both in Sweden & anciently in Britain) between *hen* Capercaillie & cock Black-cock.<sup>18</sup> — (Curious the readiness with which this genus becomes crossed. ?is red game an hybrid? — |

- 74 When I show that islands would have no plants were it not for seeds being floated about, — I must state that the mechanism by which seeds are adapted for long transportation, seems to imply knowledge of whole world — if so doubtless part of system of great harmony.

The peculiar character of St. Helena. — contrast with Otaheiti in relation (See Gaudichauds<sup>19</sup> Volume on the Botany of the Pacific.) to nearest continent. — with respect to ancient geography of Atlantic Tristan D'Acunha ditto. Juan Fernandez do |

- 87 which is often the case, & why should organic affections always influence the sexual organs alone. —

It is singular pheasant & fowl being so totally infertile whereas animals further apart have bred inter se. —

These hybrids are very wild & take in disposition after their pheasant parents. —

<sup>14</sup> William Thompson, "On the Irish hare", *Ann. Nat. Hist. or Mag. Zool. Bot. & Geol.*, vol. 2, 1838, p. 70; on p. 71 there is an allusion to Thomas Campbell Eyton's discovery that the tail of the Irish hare is shorter and has 3 less vertebrae than the tail of the English hare.

<sup>15</sup> *Ann. Nat. Hist. or Mag. Zool. Bot. & Geol.*, vol. 2, 1838, p. 69 reports a verbal communication to the Royal Society of Edinburgh on 9 April 1838 by Dr Macdonald.

<sup>16</sup> Henri-Marie de Blainville, "Doutes sur le prétendu Didelphe fossile de Stonefield [*sic*]", *L'Institut*, tome 6, 1838, p. 275.

<sup>17</sup> *L'Institut* 1837. p. 351 " . . . Zoologie : *Mammifères nouveaux*. — M. Jourdan présente un mémoire dans lequel il décrit cinq Mammifères . . . 5° Paradoxure des Philippines (*Paradoxurus Philippinensis* J.) . . . "

<sup>18</sup> *Athenaeum*, 1838, p. 654: "Dr Charlton exhibited a specimen of *Tetrao Rakkelhan*, of Temminck, and read a short notice, to prove that this bird, though described as a distinct species, . . . was in fact nothing but a hybrid, between the hen capercaillie and blackcock".

<sup>19</sup> Charles Gaudichot-Beaupré, *Botanique du Voyage autour du monde fait sur l'Uranie et la Physicienne*, Paris, 1826. The author of the entire work is Louis de Freycinet.

(There are some  $3/4$  birds of which I think there must be some mistake in their origin)

Saw cross between Penguin Duck from Bombay & Canada Goose. — Former strange mishaped bird & looks very artificial bred but Mr. Muller says that breeds  
88 larger numbers, & rears an | unusual number out of any one nest, even more than common duck — Male Penguin was crossed with hen Canadian offspring, I should say in every respect most like Penguin duck. — *which is strange anomaly in Yarrells Law.*<sup>20</sup> — it probably is explained by the vigour of their propagating powers. (as if they were a good species or local variety & not effect of breeding in & in, like our pidgeons).

The male of every animal certainly seems chiefly to impress the young most with its form & disposition |

89 Saw there young duck, like each other, — (& not very like either either . . . or Pintail ducks) from which they were descended they . . . from  $1/2$  pintail drake into pintail. — of them there were four two like each other & two dark coloured & different. — the former were the parents of the little ones |

90 Same man crossed Jackal & dog (offspring did not go to teat but parts swelled, though no fluid came from them. — showing how gradually every change is effected) — the one in the garden is from father dog & hence general appearance of face & tail somewhat like dog — though it has full share of Jackal shape |

101 of white speckles on elbow joint — in Bewick drawing<sup>21</sup> the the rock Pidgeon has not : now how many wild pidgeon have *spangles* on this part : this will be well worth working out. —

Study Temmincks<sup>22</sup> work on Pidgeons, & see whether feathered legs, — car[r]uncles on beak as in Muscovy duck, crested feather, pouters, fan tails, are found in any *colours* of plumage &c &c. Pouting pidgeon exaggeration of cooing. — & compare them with all the varieties. — Habits of rock pidgeon. — (I suspect *Pennant*<sup>23</sup> has described them) — (Study horns of wild cattle. — & plumage of fowls — *long* ears of rabbits. — & long fur. — feathers on legs of Ptarmigan & in Bantam. —) In the Pidgeons trace the washing out of the forked band, like in plumage of ducks. — |

102 Mr. Yarrell says in very close species of birds, habits when well watched always very different. — the two redpoles can hardly be told apart, so that after differences were pointed out Selby confounded them, yet can readily be told by incubation & other peculiarities. — (Mem. Goulds Willow Wren.) — (Goulds story of Water-Wagtails mistaken both species scattered over Europe) — The habits of some same North American & European birds slightly different — Barn Owl in the former place breeds in thick vegetation in swamps — owing to barn, perhaps not being left open to them. — In singing birds, part instinctive & part acquired — thus Yarrell has Lark & Nightingale which both sing their own songs though imperfectly. — Male birds always *record* their songs, it |

105 In Scandinavia besides the Rakkehan before mentioned between Capercailzie &

<sup>20</sup> See "Darwin's Fourth Notebook on Transmutation of Species", *Bull. Brit. Mus. (Nat. Hist.) Historical Series*, vol. 2, 1960, p. 173, footnote 1.

<sup>21</sup> *Ann. Mag. Nat. Hist.*, vol. 2, 1838, p. 174.

<sup>22</sup> Coenraad Jacob Temminck, *Histoire naturelle générale des pigeons*, . . . . .

<sup>23</sup> Thomas Pennant, *Genera of Birds*, Edinburgh, 1773.

Black Cock. — the latter has crossed with the Ptarmigan *subalpina* in wild state. — Neilson<sup>24</sup> has given figure of it. — In England no doubt the cross between Pheasant & Black game is owing to their rarity, as single female in wood with Pheasants would sure to be trod & in many parts of Scandinavia these birds are very far from common. — Under this predicament, probably, alone would species cross in wild state. — Is English red Grouse a cross between Black game & the *subalpina* of Sweden, (which in summer dress somewhat resembles Red Grouse) it may be so — but very improb-

ably, for it can hardly be | thought that the cross would have adapted it to changing  
 106 circumstances. — More probably during known changes climate became unfit for *subalpina*, or some northern species, & being restricted species has been made. — In the hybrid grouse between Black Cock & Ptarmigan (probably *subalpina*) former has blue breast, latter reddish, hybrid purple — *be careful*. See to hybrids between Pheasant & Black Cock & other hybrids.

The fact of Egyptian animals not having changed is good — I scarcely hesitate to say that if there had been considerable change, it would have been greater puzzle, than none, for the enormous time |

133 Lyells Elements.<sup>25</sup> p. 290 Dr Beck on numerical proportion in shells in Arctic Ocean. p. 350 Grallae in Wealden oldest birds. p. 411 Decapod Crust in Muschelkalk & 5 genera of reptiles. — p. 417 Magnesian Limestone & Zechstein oldest rocks in which reptiles have been found. p. 426. Sauroid fish in coal. true fish & not intermediate between fish & reptile — yet osteology closely resembles reptiles. p. 432 some plants in coal supposed to be intermediate between coniferous trees & Lycopodium. — p. 437 Many existing genera of shells in the mountain limestone (how different from plants!) But the Cephalopoda depart more widely from living  
 134 forms. — p. 458 Upper Silurian fishes oldest formation highly organized. — | do. p. 461 Lower Silurian — several existing genera — Nautilus, Turbo, buccinum, turritella, terebratula, orbicula, with many extinct forms & Trilobites.

Sept. 25th In considering infertility of hybrids inter se. the first cross generally brothers & sisters & therefore somewhat unfavourable. —

28th We ought to be far from wondering of changes in numbers of species, from small changes in nature of locality. Even the energetic language of Decandolle does not convey the warring of the species as inference from Malthus. — increase of brutes must be prevented solely by positive checks, excepting that famine may stop desire. — in nature production does not increase, whilst no check prevail, but the positive check of famine & consequently death. I do not doubt every one till he thinks deeply has assumed that increase of animals exactly proportionate to the number that can live. — . .

135 Population is increase at geometrical ratio in FAR SHORTER time than 25 years — yet until the one sentence<sup>26</sup> of Malthus no one clearly perceived the great check

<sup>24</sup> Sven Nielson, *Ornithologia Svecica*, Hafniae, 1817–21.

<sup>25</sup> Sir Charles Lyell, *Elements of Geology*, London, 1838.

<sup>26</sup> This note, written on 28 September 1838, makes it possible to identify the sentence in T. R. Malthus's *Essay on the Principle of Population* which enabled Darwin to see how the pressure of natural selection is inevitably brought to bear. It was in the 6th edition, London 1826, vol. 1, p. 6: "It may safely be pronounced, therefore, that the population, when unchecked, goes on doubling itself every twenty five years, or increases in a geometrical ratio".

amongst men. — there is spring, like food used for other purposes as wheat for making brandy. — Even a *few* years plenty, makes population in man increase & an *ordinary* crop causes a dearth. take Europe on an average every species must have same number killed year with year by hawks, by cold &c. — even one species of hawk decreasing in number must affect instantaneously all the rest. — The final cause of all this wedging, must be to sort out proper structure, & adapt it to changes. — to do that for form, which Malthus shows is the final effect (by means however of volition) of this populousness on the energy of man. One may say there is a force like a hundred thousand wedges trying [to] force every kind of adapted structure into the gaps in the oeconomy of nature. or rather forming gaps by thrusting out weaker ones. — |

- 136 D'Orbigny<sup>27</sup> Comtes Rendus p. 569. 1838 says the cross between the Guaranis & Spaniards are almost white from first generation, that with Quichuas the American character is more tenacious & does not disappear for many generations.

Sept 29th Dr Andrew Smith. Remarks on extraordinary curiosity of Monkeys. The Baboon of which anecdotes have been told is *Cynocephalus porcarius*. — This monkey did not like a great coat made for it at first, but in two or three days learn its comfort & though could not put it *on*, yet threw it over |

- 151 The present age is the one for large Cetacea, as the past for other Mammalia, & still further back reptilia & Cephalopoda.

Old Jones<sup>28</sup> remarked to me that one of the children of Sir J.H. was so like Sir W. whilst Sir J. is himself not like — now this is a clear case of avitism. but then? was not the expression of Sir W. itself received from his father so that case ceases to be true avitism

Annals of Natural History<sup>29</sup> p. 135 Natural History of the Caspian Fresh water Fish!! ?adapted to Salt Water? — peculiar species. crabs & molluscs few. — ?are not some same — what is the alliance with the Black Sea. — it would be ocean. what is land to continent — Original Paper worth studying. Archiv fur Naturgeschichte.<sup>30</sup> |

- 152 September 11 *Generation* Mr. Yarrell says it is well known that in breeding very pure South Down that the ewe must never be put to any other breed else all the lambs will deteriorate. — Lord Moreton's<sup>31</sup> case —

When cows have twins, though capable of producing both pair of male & female. — if there be one female, she will be free Martin.<sup>32</sup> See Hunter's Owen —

<sup>27</sup> Alcide Dessalines D'Orbigny, "L'Homme américain (de l'Amérique méridionale), considéré sous ses rapports physiologiques et moraux", *Comptes Rendus Acad. Sci. Paris* tome 7, 1838, p. 569.

<sup>28</sup> Unidentified.

<sup>29</sup> *Ann. Mag. Nat. Hist.*, vol. 2, 1838, Bibliographical Notices, p. 135, refers to subject of following footnote.

<sup>30</sup> E. Eichwald, *Einige Bemerkungen über das kaspische Meer*, *Archiv. für Naturgeschichte*, 4ter Jahrgung, Bd. 1, pp. 97-112, . . . ; on p. 97: "Wenn gleich die grösste Zahl der Fische des Meeres Flussfische sind, die jedoch als solche nicht an den Mündungen der grösseren Flüsse, also da, wo das Seewasser süß ist, leben, so finden sich dennoch mehrere Arten, und zwar aus Gattungen, die bisher nur im salzigen Seewasser beobachtet wurden".

<sup>31</sup> cf. "Darwin's First Notebook on Transmutation of Species", *Bull. Brit. Mus. (Nat. Hist.) Historical Series*, vol. 2, 1960, p. 63, footnote 7.

<sup>32</sup> John Hunter, *Observations on certain parts of the Animal Oeconomy*, with notes by Richard Owen, London, 1837, p. 34, "Account of the Free-Martin".

In the *Athenaeum*<sup>33</sup> Numbers 406, 407, 409 Quetelet papers are given & I think facts there mentioned about proportion of sexes, at birth & causes. |

- 159 they first appear occupy their *proper* positions, — this would be argument for development of either. — (Mammae or sheath of horses penis reduced to extreme degree of abortion). — Insecta. — hermaphrodite. being not only dimidiate, but quarter grown seems to show whole body imbued with possibility of becoming either sex. — In my theory I must allude to separation of sexes as very great difficulty, then give speculation to show that it is not overwhelming. —

Seeing in Gardens of Hybrids between common & Silver Pheasant, one like cock & other like hen — one doubts whether they are not Hermaphrodites, like J. Hunters Free Martin. N.B. the common mule must often have been dissected. |

- 160 Zoolog. Garden. Sept. 16. Hybrid between Silver & common Pheasant. Mule bird, said to be infertile. — spurs rather smaller than in silver male — Head like silver except in not having tuft. — back like do. — but the black lines on each feather instead of coming to point are more rounded. & much broader, & three I believe, instead of two lines, faintly edged with reddish brown — black marks on tail much broader. — Breast red like common pheasant — lower part of breast each feather is fine metallic green with tip & part of shaft metallic green. — This green doubtless is effect of metallic hue of silver pheasant. yet why green? & not purple? — leg pale coloured. — In the back feathers, we have character different from either parent bird — |

- 173 the manner in which frogs copulate & fish show how simply instinctive the feeling of other sex being present is — it also shows that semen must actually reach the ovum. — [Why in making a bud, which is to pass through all transformations should there need two organs; whilst in common bud there is no such need. — one would suppose that the vital portion ?nerves? passed through transformation & was received into bud matured by female: such view no way explains Lord Moreton's case: without the nervous matter consists of infinite numbers of globules: generally sufficient for one birth or other] II. It should be observed that the constant necessity for change in process of generation applies only [to] the more complicated animals.

p. 310 She wolf took dog<sup>34</sup> but had such aversion to it, that she was held. Hunters Oeconomy. So with inter-breeding as told by Willis<sup>35</sup> |

- 174 v. infra p. 179 continued from

Is a flower bud produced by union of two common buds??? Amongst buds each one exactly like its parents. all alike in one parent or tree, but not in other trees. — Why should there be a necessity that there should be something each time added to that kind of generation, which typifies the whole course of *change* from simplest

<sup>33</sup> Adolphe Quételet, "On Man and the Development of his Faculties, &c." *Athenaeum*, nos. 406 407, 409, 1835; pp. 593-5, 611-3, 658-61; on p. 611: "an examination of births registered in France during a lapse of fourteen years, that the average number of male births to female was 106.38 to 100 . . . he proceeds to inquire into the external circumstances by which these proportions may be partially affected; . . . that the number of male births is relatively less predominant in cities than in agricultural districts".

<sup>34</sup> John Hunter, *op. cit.*, p. 323: "she would not allow any dog to come near her . . . She was held, however, while a greyhound dog lined her".

<sup>35</sup> cf. "Darwin's Second Notebook on Transmutation of Species", *Bull. Brit. Mus. (Nat. Hist.) Historical Series*, vol. 2, 1960, p. 110, footnote 4.

form. — (Because by the process it separates those differences which are in harmony with all its previous changes, which mutilations are not). but why should it demand some further change? Man properly is hermaphrodite (hence monstrosities tend that way from frequency of this tendency all mammals must long have so existed with double union.[])] — At present I can only say the whole object being to acquire differences, indifferently of what kind, either progressive improvement or deter[ioration] . . that object failing, generation fails. — How completely *circumstances* alone make changes or species !! The view of each man or mammalia being abortive hermaphrodite simplifies case much ; & originally each hermaphrodite being simple (are not coniferous trees generally dioecious oldest forms) |

*Pages excised from Fourth Notebook*

## IV

- 5 Those who have studied history of the world most closely & know the amount of change now in progress, will be the last to object to the theory on the score of small change — on the contrary islands separated with some animals &c. — If the change could be shown to be more rapid I should say then some link in our train of geological reasoning extremely faulty.

The difficulty of multiplying effects & to conceive the results with that clearness of conviction, absolutely necessary as the basal foundation stone of further inductive reasoning is immense.

It is curious that geology by giving proper ideas of these subjects should be *absolutely* necessary to arrive at right conclusion about species.

- 6 Changes of level &c. are easily recorded, but change of species not as — without every animal preserved. the latter pages in the history are perfect, | we obtain a glimpse only of the changes which the government is subject to. — further back we obtain here & there in order a scattered page, we find sensible change in the institutions & we suppose not only revolutions, but certain obliterations & first laws created, & yet with symmetry & regular laws that baffles idea of revolution. —

My very theory requires each form to have lasted for its time: but we ought in same bed if very thick to find some change in upper & lower layers. Look at whole Glacial period — Good objection to my theory: a modern bed at present might be very thick & yet have same fossils. does not Lonsdale<sup>1</sup> know some case of change in entire series |

- 9 Study introduction to Cuviers<sup>2</sup> Règne Animal.

No structure will last without it is adaptation to *whole* life of animal, & not if it be solely to womb as in monster, or solely to childhood, or solely to manhood. — it will decrease & be driven outwards in the grand crush of population. —

Octob. 10<sup>th</sup>. Saw two undoubtedly rabbits in poulterer shops, of same colour as a Hare, but paler & buffer — with long ears & longer hind legs ??? — so that I was almost doubtful which it was. — do hind legs increase in any rabbits |

- 10 One may strongly suspect that breeding in & in, produces bad effects solely, because of similarity, because in every country, where only pair has been introduced, & have freely bred, they have not lost power of producing.

Williams Narrative of Miss. Enterprise<sup>3</sup> p. 497. Vampire bats abound in the Navigators & at Manguia, but are unknown eastward of the Navigators. Snakes occur there, but are unknown in Henry or Society isles. |

- 11 Hope<sup>4</sup> says positively he has seen a Calosoma (very like American form) in Stonesfield slate, & a Melolon . . . [?] In marl from Lake Constance species of European genera =. — Hope has idea about generic character dominant predominant &c. having relation to geographical distribution. — Thus Hattica is such genus. — because found in all quarters: his ideas not clear. In Australia some approach to

<sup>1</sup> William Lonsdale.

<sup>2</sup> Georges Cuvier, *Le règne animal*, Paris 1817.

<sup>3</sup> John Williams, *Missionary enterprises in South Sea Islands*, London 1837.

<sup>4</sup> Frederick William Hope, personal communication.

Asiatic in part near Timor, & to European in Van Diemens land where there is close species of elater — Where this collection is particularly rich as in Lucanidae less difficulty in establishing good groups. — |

- 12 ears varying so much. — kind of fur (do tips of ears take any colour?) — length of tail varies & character of fur — I am sure a very good case might be made out of variation analogous to specific variations. —

Kerrs<sup>5</sup> Collect of Voyages Vol. 8 p. 46 Capt. Davis in 1598 found cattle in Table Bay with Hump on their back & big-tailed sheep.

- do. Vol. 10. p. 373 & 374 Spaniards say no Tortoises in the place besides Galapagos<sup>6</sup> |  
13 do. 376. Isle Tres Marias off Mexico with small Hares & *raccoons* S. American form — off province of Guadalaxura<sup>7</sup> —

October 11<sup>th</sup>. — Uncle John<sup>8</sup> says Decandolle<sup>9</sup> distributed seeds of Dahlia all over Europe same year. — he sowed them for four generations before they broke. — showing effects of cultivation gradually adding up. & four more generations before they began to double. —

- At present time Uncle J. does not suppose one aboriginal variety for they are all  
14 made by fertilizing | one plant with another — Uncle John says he has no doubt bees fertilize enormous number of plants — it is scarcely possible to purchase seeds of any cabbage where a great many will not return to all sorts of varieties, which he attributes to crossing. — Cape Broccoli can hardly be reared without greatest care be taken to prevent fertilization from turnips & other stocks. Says if any variety of apple be sown, all |

- 19 in the cats, the joints near the tip of the tail were generally crooked, as if they had been broken". are born so in all Malay countries W. Earl.<sup>10</sup> Eastern Seas, p. 233.

Octob. 12. Kotzebues<sup>11</sup> Second Voyage Vol. II, p. 344. account of insects of St Peter & St Paul in Lat 53° yet fauna like that 60° & 70° of Europe. — Many European insects. list given — some peculiar —

do. p. 359. At Manilla a small Cercopithecus., & skins of Galiopithecus. —

Malte Brun<sup>12</sup> Vol. XII p. 133 at Samar SE of Luçon, many monkeys, buffaloes &c &c — Malte Brun would be worth skimming over with regard to this archipelago |

- 20 Octob. 13<sup>th</sup>. — Kotzebues First Voyage<sup>13</sup> Vol. II p. 867. "The Fauna of the Sunda islands presents us, for the most part, with the same families and genera,

<sup>5</sup> Robert Kerr, *A General History and Collection of Voyages and Travels* . . . London, 1811–1824 ; vol. 8, p. 46 : " Their cattle are large, and have a great lump of flesh on the shoulder, like the back of a camel. Their sheep have prodigiously large tails, entirely composed of fat, weighing twelve or fourteen pounds, but are covered with hair instead of wool ".

<sup>6</sup> *ibid.*, vol. 10, p. 373 : " The Spaniards say there are no others in these seas, except at the Galapagos, but they are common in Brazil ".

<sup>7</sup> *ibid.*, vol. 10, p. 376 : " The *Tres Marias*, or Three Marias, off the Western coast of Guadalaxara, in the kingdom of Mexico . . . There are also many excellent hares, but much smaller than ours. We saw likewise abundance of guanans and some racoons, which barked and snarled at us like dog ".

<sup>8</sup> John Hensleigh Allen of Cresselly.

<sup>9</sup> Augustin Pyramus de Candolle.

<sup>10</sup> George Windsor Earl, *The Eastern Seas ; or Voyages and Adventures in the Indian Archipelago in 1832, 1833, and 1834*, London, 1837 ; p. 233 : " Here, as in all Maya countries I noticed a peculiarity in the cats, which I never heard satisfactorily accounted for. The joints near the tip of the tail are generally crooked, as if they had been broken ".

<sup>11</sup> Otto von Kotzebue, *New Voyage round the World, 1823–1826*, London, 1830.

<sup>12</sup> Conrad Malte Brun, *Annales des voyages*, Paris, 1809–14.

<sup>13</sup> Otto von Kotzebue, *Voyage into the South Sea and Beering's Straits 1815–1818*, London 1821.

- that are natives of S. Asia, but many of the *species* are peculiar to them". do. p. 368 "Several kinds of animals have spread from the end of Borneo to the adjacent island — In Soolos we find the elephant — in Magindaneo several kinds of the large monkeys. — Fewer mammalia have passed to Paragua & in Luçon the most northern of the group the number is limited["] |
- 21 do. Vol. III p. 77 Kotzebues Second Voyage Many foreign plants have been introduced in Guahon (Mariannes), "for example the prickly *Limonia trifoliata*, which cannot now be checked". — Marsden<sup>14</sup> p. 94 (1st Edit) of Sumatra has given account of Buffalo of the East which differs from that of S. Europe —  
p. 189 The giant kind of crocodile sometimes wanders from Pellew to Eap [Yap] — There is another great Lizard, Kalug, which is found at Pellew & Eap, but not at Feis (near island) |
- 22 do. p. 190. The inhabitants of Summagi, a territory in the small isl<sup>d</sup> of Eap in the Carolines are remarkably short. — & Deformations are particularly common. — without arms, hands, thumbs, — one leg, hare lip &c. &c. In Vol II p 363 account of Flora of Pacific. given in my coral paper.<sup>15</sup>  
Oct. 14th. Macleay<sup>16</sup> says that any character even colour is *good* (i.e. invariable) in some classes. — it is because every part is under change, now one part now another — |
- 25 Octob. 19th. When reading l'Institut 1838 p. 329. Milne Edwards<sup>17</sup> description of curious mechanism of respiration or rather ventilation peculiar to some orders of crustacea, one is tempted to think that it must have been invented all at once. — but naturalists if they had series perfect, would expect this structure would become obscure & therefore it might then have arisen, & M. Edwards p. 330 distinctly states that the flipper is a mere simple modification of an organ present in whole class. |
- 26 Case of Mexican greyhounds. — young being habituated instance such as Hunter,<sup>18</sup> or some one mention of influence on parent affecting offspring. — & as *adaptation*. — however mysterious such is case. therefore chance & unfavourable conditions to parent may be become favourable to offspring: Australian dogs having mottled coloured puppies case of this. — tendency in manner of life to be mottled & hereditary *tendency* determines the puppies to be so. — |
- 35 ARGUMENT REAL of antiquity of reasonable cosmopolite man. l'Institut<sup>19</sup> 1838 p. 338. *Important account* of cross of sheep & Moufflon of Corsica, sadly against Yarrell's law. — not so much against my modification of it — Goat & Moufflon will not breed —

<sup>14</sup> William Marsden, *History of Sumatra*, London, 1783.

<sup>15</sup> Darwin's paper on Coral Islands, written in 1835, has been published, with an introduction by D. R. Stoddart, by Pacific Science Board, National Academy of Sciences, Washington D.C., Atoll Research Bulletin No 88, 15 December 1962.

<sup>16</sup> William Sharp MacLeay, personal communication.

<sup>17</sup> Henri Milne-Edwards, *L'Institut*, tome 6, 1838, p. 329: "un système de palettes qui fonctionnent à la manière des ventilateurs et opèrent le renouvellement de l'eau par appel, en rejetant sans cesse au dehors une portion du liquide contenu dans la cavité branchiale".

<sup>18</sup> John Hunter, *Observations on certain parts of the Animal Oeconomy* with notes by Richard Owen, London, 1837.

<sup>19</sup> *L'Institut*, tome 6, 1838, p. 338. Zoologie: *Metis du Moufflon et du Mouton*. — "M. Flourens donne lecture d'une note de M. Marcel de Serres sur un métis provenu de l'accouplement du Moufflon et du Mouton . . ."

p. do — <sup>20</sup>Fish of Teneriffe. St. Helena & Ascension most species like & *identical* with S. America & many very *close*. See full paper A most grave source of doubt in distinguishing which parent impresses offspring most is whether mother has had any offspring before — now this is never stated. |

- 36 Regarding the similarity of offspring to Parent same laws appear to hold good with regard to marriage of individuals & varieties of same species & to different species — sometimes like one parent & sometimes other & sometimes 1/2 way. Ed. New Phil. Transact<sup>21</sup> Rabies common to men dogs horses cows pigs & sheep — disease common for men and animals cowpox — case in Spain of pustulous disease following handling sheep — all case do. p. 354 The most vicious dog will not attack any animal except dog when absent |

- 41 *Vegetation* & conchology. — shells of Africa ought most to resemble fossil ones of Europe. Consider probable form of land. — S. America, an island, connects with Asia between two polar lands. — Africa not so *equatorial*. —

The fact of no Mam : Placent : insectivore being in S. America & Australia reason why Marsupiaata when fresh introduced live & multiplied specifically & individually. — |

- 42 I see clearly from F.R.<sup>22</sup> it will be highly necessary to show that if species fall, genera must. Lesson<sup>23</sup> I remember says Mariana Deer very close to a Molucca species. —

L'Institut 1837, p. 253 on animals of Antilles.<sup>24</sup> (see Macleay<sup>25</sup> in Zoolog. Journal on those of Cuba. — It is important to understand well the relation of passage from N. to S. American forms.

The climate of N. America must have been *equable* & *far* more so than any other part of the World. — Europe perhaps less so than either Americas. — |

- 85 Decem. 21st L'Institut<sup>26</sup> 1838 p. 414 M. Eichwald has published Fauna of Caspian. — fishes fresh water kinds (yet living in the Salt ?) — very few animals of any kind — Fauna must be very curious — with respect to the non-development of Mollusca, which I have sometimes speculated might be owing to absolute quantity of vitality in the world : — *the production of vitality*, as argued by Müller from propagation of infinite numbers of individuals from one of adverse. — |

<sup>20</sup> L'Institut, tome 6, 1838, p. 338. Géographie Zoologique : Poissons des îles Canaries. — "M. Valenciennes lit des considérations sur l'ichthyologie de l'Atlantique et en particulier sur celle des îles Canaries . . ."

<sup>21</sup> Edinburgh New Philosophical Journal vol. 24, 1838, p. 353 "Observations on Rabies or Madness in Dogs, Oxen, Horses, Pigs, and Sheep. by Dr. Wagner . . ."

<sup>22</sup> Dr Sydney Smith suggests that Darwin intended to write "F.B." meaning Sir John Richardson's *Fauna Boreali-Americana* . . ., London, 1829-1837.

<sup>23</sup> René Primevère Lesson, in Louis Isidore Duperrey, *Voyage autour du monde . . . sur la corvette La Coquille*. Zoologie, Paris, 1826-1830.

<sup>24</sup> P. Gervais, L'Institut, tome 6, 1838, p. 253 : "Zoologie : Mammifères . . . communique une note sur les animaux mammifères des Antilles".

<sup>25</sup> William Sharp MacLeay, "Notes on Capromys", Zool. Journ. vol. 4, 1829, p. 269 ; cf. "Remarks on the Comparative anatomy of certain birds in Cuba", Trans. Linn. Soc. Lond., 16, 1833, p. 1.

<sup>26</sup> L'Institut, tome 6, 1838, p. 412 *Chronique*

"— Un travail de M. Eichwald récemment publié sur la faune de la mer Caspienne a donné à ce savant l'occasion de combattre l'opinion que la mer Caspienne aurait été primitivement unie à la mer Noire. Il se fonde dans cette conclusion sur la différence qui résulte de la comparaison des faunes des deux mers. Le plus grand nombre des Poissons de la Caspienne sont des Poissons d'eau douce. Cette mer est de la plus grande pauvreté en animaux marins, surtout quand on la compare à la mer Noire. Et cependant, dit M. Eichwald<sup>1</sup> si les deux mers avaient été autrefois en communication, on ne devrait trouver dans l'une aucune espèce qui ne fût également dans l'autre".

- 86 Decemb. 25th Lyell says the elevated shells in Bayfields district are much more like those of Scandinavia than of the N. American species — Dr Beck says the shells in Scandinavia from height of 200 & 300 ft. are identically same as those of present seas. — now in this country we have better means of judging the *slowness* of physical changes, than in any other. & yet 200–300 ft. no elevation & no change & even no loss of species. |
- 87 It must never be overlooked that the chronology of geology rests upon amount of physical change & only secondarily, by assumption well grounded, on time; — therefore the mere loss of species, which may be the works of a few years as with the Lamantin of Steller<sup>26A</sup> tells much less though it also the effect of change, than a slow gradation in form which must be effect of slow change & therefore precludes effects of catastrophes, which must serve to confound our chronology. CONSIDER ALL THIS. — Extinction & transmutation, two foundations, hitherto confounded, of geology. — |
- 88 L'Institut 1838. p. 414 M. Guyon<sup>27</sup> thinks monsters more common in Africa than in Europe especially with Europeans settled there.  
L'Institut do. p. 419. long account of Hyaenodon, a fossil dog leading towards Hyaena.<sup>28</sup> — See Comte Rendu. — I suspect good case of fossil filling up blank. — not between existing series of species of dog & Hyaena. — but a common point. whence both may have descended. — |
- 91 continent. in like manner as Madagascar does to otherside of Africa. — (Juan Fernandez to Chile ??) Falklands to southern portion. Annals of Nat. Hist.<sup>29</sup> 1838 — do p. 269 on fresh water fish peculiar to Ireland.<sup>30</sup> do. p. 283. on the dark ears of the wild Chillingham cattle,<sup>31</sup> with reference to Mr. Bell's<sup>32</sup> statement of the tame ones, — an instance of a trifling peculiarity not to be eradicated. — do. p. 305. — Mr. Owen<sup>33</sup> says in abstract in his paper on the Dugong, "The generative organs being those which are most remotely related to the habits & food of an animal, I have always regarded as affording very clear indication of its true affinities. We are least likely in the modifications of these organs to mistake a merely *adaptive* to an *essential* character" — How little *clear* meaning has this to what it might have. — |
- 92 What is the difference between an *essential* character & an *adaptive* one. — are not the essential ones eminently adaptive. — Does it not mean *lately* adapted or trans-

<sup>26A</sup> Stellers Sea-cow.

<sup>27</sup> M. Guyon, *L'Institut*, tome 6, 1838, p. 414: Tératologie, "en Afrique les monstruosités sont plus communes qu'en Europe".

<sup>28</sup> M. Laizer & M. Parieu, *L'Institut*, tome 6, 1838, p. 419; Paléontologie: Mammifère inconnu . . . "Description et détermination d'une mâchoire appartenant à un Mammifère jusqu'à présent inconnu . . . Hyaenodon".

<sup>29</sup> Edward Forbes, *Annals of Natural History*, vol. 2, 1838, p. 250: "On the Land and Freshwater Mollusca of Algiers and Bougia".

<sup>30</sup> William Thompson, *Annals of Natural History*, vol. 2, 1838, p. 269: "On Fishes; containing a notice of one Species new to the British, and of others to the Irish Fauna" (*Salmo ferox*, Lake Trout, in Lough Neagh, cf. *Proc. Zool. Soc.* 1835, p. 81.)

<sup>31</sup> L. Hindmarsh, *Annals of Natural History*, vol. 2, 1838, p. 274, "On the Wild Cattle of Chillingham Park"; on p. 283: "in the colour of the ears there is a trifling difference, but this appears to be an occasional variety in the species".

<sup>32</sup> Thomas Bell, *History of British Quadrupeds*, London, 1837.

<sup>33</sup> Richard Owen, *Annals of Natural History*, vol. 2, 1838, p. 305, reference to *Proceedings of the Zoological Society*, 27 March 1838, containing this statement.

formed & hence not indicative of true affinity. — Owen<sup>34</sup> says Dugong connected with Pachydermata. — p. 306. the Dugong cannot be united with true Cetacea or whales.<sup>35</sup> — but an aquatic Pachyderm & Walrus — aquatic seal — (Consult this passage when considering origin of Northern Cetacea). — do p. 318 M. Pictet<sup>36</sup> of writing of Goethe, alludes to difference between fossil & recent Bull: like fossil & recent shells of the new raised beaches.—who maintains that |

103 Sr C Bell<sup>37</sup> has some account of wolf in Zoolog. Gardens which brought its puppies to be fondled. — and we see in the Australian dog an instance of a half reclaimed animal.— the dogs, which have been wild here, have done so in hot countries. One ought to be able to hybridise the camel. Camel does not vary like ass & horse in lesser degree, how different to dog! (Hybrids of Calceolaria.) Same way some plants vary more than others: Does the Power of easily making tolerably fertile hybrids bear relation to capability of Variation? my theory says so. |

104 March 6th. Mr Bentham<sup>38</sup> says in Sandwich Isld. he believes there are many cases of genera peculiar to the group having species peculiar to the separate islands. In his work on the Labiatae some of these species are described. — capital case. — for Sandwich Isld<sup>s</sup> are very similar to Galapagos — study Flora. what general forms. — are the Labiatae nearest to American or Indian groups? Believe some Mediterranean, but chiefly *mountainous* — this is very important (Sicily exception) see if this can be generalized—isld<sup>s</sup> have peculiar |

115 Rhododendron ferrugineum begins at 1600 metres precisely & stops at 2600 & yet know that plant can be cultivated with ease near London — what makes the line, as of trees in Beagle Channel — it is not elements! — We cannot believe in such a line. it is other plants. — a broad border of killed trees would form fringe — but there is a contest & a grain of sand turns the balance. — M. Ramond p. 19 do. (Hort. Transact. Vol I)<sup>39</sup> says lofty Alpine plant of Pyrenees agree with those of Norway, Lapland, & Greenland. but not | with those of Kamtchatka, Siberia, or 116 even of polar regions of N. America. — if true curious on my view — because these points were last connected with those northern regions.<sup>40</sup> do. p. 21 says many

<sup>34</sup> Richard Owen, *ibid.*, p. 307: "I conclude, therefore, that the Dugong and its congeners must either form a group apart, or be joined as in the classification of M. de Blainville, with the Pachyderm".

<sup>35</sup> Richard Owen, *ibid.*, p. 306: "Now we have seen . . . the junction of the Dugongs and Manatees with the true Whales cannot therefore be admitted in a distribution of animals according to their organization".

<sup>36</sup> M. F. G. Pictet, "On the writings of Goethe relative to Natural History", *Annals of Natural History*, vol. 2, 1839, pp. 313–322; on p. 321: "his observations on the researches of Dr Jaeger upon the subject of fossil bulls found in the neighbourhood of Stuttgart. Goethe seeks to prove in this article, that the difference which exists between fossil and recent bulls may be looked upon as the result of the perfecting of the species during the centuries which separate the two periods".

<sup>37</sup> Sir Charles Bell, *Anatomy and Philosophy of Expression*, London, 1806.

<sup>38</sup> George Bentham, *Labiatarum genera et species*, London, 1832–6.

<sup>39</sup> *Transactions of the Horticultural Society of London*, 1820 (3rd ed.) Appendix IV, p. 15 "On the Vegetation of high Mountains, translated from a Paper of M. Ramond's in the *Annales du Muséum*, vol. 4, p. 395." By Richard Anthony Salisbury . . . On p. 19 "... Norway, Lapland, and Greenland, furnish plants analogous to those of the Swiss Alps and Pyrenees, but few, or possibly none of them, are seen in Siberia, Kamschatka, or even in the polar regions of America. . . ."

<sup>40</sup> *ibid* p. 21 "... grow wild in the same place, and follow the same route. The *Anthericum Bicolorum* of Algiers, traverses the same chain of mountains, and arrives in Anjou. The *Scilla Umbellata* and *Crocus Mudiflorus*, have migrated from the Pyrenees even into England. Yet not one of the above mentioned vegetables has been disseminated laterally, to meet those southern ones which have crossed the Swiss Alps. . . ."

plants skirt each side of the great N & S valleys, which penetrate Pyrenees in branch valleys — M. Ramond offers no explanation.

- 119 Examine list of St Helena Plants & see whether those which grow in low ground are those, which are common & nearest being common to other parts of the world. —

March 16<sup>th</sup> Mr. Lonsdale showed me two specimens of an *Inoceramus* from the Gault of Folkestone, which is exactly intermediate between *I. concentricus* & *I. sulcatus*. — the beak of this one has concentric striae, all the lower part rayed longitudinally (give woodcut) like *I. sulcatus*. — Both species are | found at Folkestone. — 120 it is unnamed this intermediate one. — Mr. Lonsdale evidently inclines to think it *Hybrid* !!! Ask Woodward<sup>41</sup>

Mr. Lonsdale says *Trigonia costata* & *elongata* though considerably different in proportional dimensions must be considered merely varieties & even Mr. Sowerby is coming to this conclusion, from specimens in grades, now L. says that *T. costatus* | 121 is in England found in the Inferior Oolite, & the *T. elongata* in the Upper formation Portland Stones &c. &c. — if so it is good case : — In Sowerby<sup>42</sup> Min. Conch. it is however, said they have been found *together* in coast of France. — L. doubts. — Lonsdale thinks Ammonites would afford instance of such facts. — Ask Phillips.<sup>43</sup> — |

- 122 The more I think, the more convinced I am, that *extinction* plays greater part than *transmutation*. — Do species *migrate* & *die* out? —

March 20<sup>th</sup>. Phillips in Lecture in Royal Institution says shells become less in number (?species or individuals) the deeper one goes — surely is this true? — most strange. — In the place where any species is most common, we need not look for change, because its numbers show it is perfectly adapted ; if where few stray ones are that change may be anticipated, & thus fresh creation. the gardener separates a plant he wishes to vary — domesticated animals tend to vary. |

- 123 Does not spermatic animalcule in Mosses render my view of the crossing of mosses & all others by action of wind difficult. —

Cline on the breeding of animals.<sup>44</sup> p. 8. size of foetus in proportion to male parent. p. 8. his whole doctrine of the advantage of crossing consists in the idea of the male being smaller, & the female larger than the average size : (surely this is very limited view though perhaps a true element) give examples : pigs with small chinese boar &c. &c. &c. Offspring take more after father than mother ; illustrated by the crossing of hornless sheep with horned. — compare this with what highland shepherd said. — |

- 124 p. 12. Attempts to improve the native animals of any country must be made with great caution ; owing to its adaptation to the surrounding circumstances. According to my theory no *land* animal with *fluid* seeds can be true hermaphrodite. —

Man probably assumes the hairy character of his forefathers only when advanced in age, & therefore the children do not (& in hairless kittens we see same fact) go

<sup>41</sup> Samuel Pickworth Woodward (1821–1865) was 18 years old in 1839 which shows that this pencil note was added at a date later than that at which the Notebook was written.

<sup>42</sup> James Sowerby, *Mineral Conchology of Great Britain*, London, 1812–46.

<sup>43</sup> John Phillips, author of *A Treatise on Geology*. *Lardner's Cabinet Cyclopaedia*, London 1837.

<sup>44</sup> Henry Cline, *Observations on the Breeding and Form of Domestic Animals*, London, 1829.

125 back, & this is argument against Blyth's<sup>45</sup> | doctrine of young birds retrogressing — Uncovering the canine teeth or sneering, has no more relation to our present wants or structure, than the muscles of the ears to our hearing powers.

E.<sup>46</sup> frowns prodigiously when drinking very cold water, frowns connected with pain as well as intense thought. —

No one but a practised geologist can really comprehend how old the world is, as the measurements refer not to revolutions of the sun & our lives, but to period necessary to form heaps of pebbles &c. &c. : the succession of organisms tells nothing about length of time, only order of succession. |

126 Splendid Pamphlet (published in *Philosoph. Journal* April 1<sup>st</sup> 1839) by Sedgwick & Murchison<sup>47</sup> ; which is a beautiful instance of *forms*, intercalated between two great distinct formations. — particulars are given p. 246–248 & 258.

A beautiful case showing the gradation from one grand system to another : in each system, the changes from limestone to san[d]stone &c. show some great change who can say how many centuries elapsed between each of these gaps. far more probably than during the deposition of the beds. — The argument must |

129 April 3<sup>d</sup>. — Henslow<sup>48</sup> tells me following facts : believes that only red *Lychnis* grows in Wales & certainly only white in Cambridge. in some counties sometimes one & sometimes other. — there is some difference of habit between these varieties, so that they have been thought to be different species. *Lychnis dioica*, generally dioecious yet parts only very slightly abortive & bed of female flowers will sometimes produce a few seeds. — *Ruscus aculeatus* a dioecious plant, in which the male plant

130 sometimes | bears female flowers, the organ. are most clearly abortive, so that they become so by suppression of one organ. here language forces on us the change, which seems to have taken place. — Almost all Dioecious & monoecious plants have rudimentary abortive organs, even more so Polygamia : Monoecia & Dioecia, preeminently artificial, so that even some species only in genera have this structure. —

Some willow trees have been observed to change their sex. — this effect from age, what Mr. Knight<sup>49</sup> |

139 then dropped it & was found alive. Stanley's *Familiar History of Birds*<sup>50</sup> — several cases on record of stoats being carried (p. 121) & dropped having wounded the bird. p. 124 — Mr. Willoughby<sup>51</sup> found a dead lamb & hare by the side of Eagles nest, which shows power of carrying great weight p. 125. is said that Eagles bring rabbits

<sup>45</sup> Edward Blyth, *Annals and Magazine of Natural History*, vol. 9, 1836, p. 402 : " Every modification of every successive type is thus rudimentally different from the most approximate modifications of every other equivalent type, or superior type, to which it does not appertain ; and this is the same conclusion to which I have been irresistibly led from consideration of various phenomena connected with the change in plumage which takes place in birds. As every species is perfectly and essentially different from every other species, so, except in a retrograde direction, are the successive typical and subtypical plans upon which they are severally organised ".

<sup>46</sup> Erasmus Alvey Darwin, Darwin's elder brother.

<sup>47</sup> Adam Sedgwick & Roderick Murchison, " Classification of the Older Stratified Rocks of Devonshire and Cornwall ", *Philosoph. Mag.* vol. 14, 1839, pp. 241–260.

<sup>48</sup> John Stevens Henslow.

<sup>49</sup> Thomas Andrew Knight.

<sup>50</sup> Edward Stanley, *Familiar History of Birds*, London 1838.

<sup>51</sup> Francis Willoughby. In the 1854 edition of Edward Stanley's *Familiar History of Birds* " . . . Mr. Willoughby, an excellent authority, mentions a nest which he saw in the woodlands, near the river Derwent, in the Peak of Derbyshire, some 150 years ago. . . . and by them a lamb and a hare, and three heath-pouls. . . . "

& hares to the young ones to exercise them in killing them. "Sometimes it seems hares, rabbits, rats & not being sufficiently weakened by wounds get off from the young ones while they were amusing themselves with them and one day a rabbit  
 140 escaped into a hole, where | the old Eagle could not find it. — The parent bird another day brought to her young ones the cub of a fox which after it had fought well & desperately bitten the young ones would in all probability have escaped" — if it had not been shot by a shepherd who was watching the scene. — In Shiart Isl<sup>d</sup> it is said, that an Eagle always procured its prey from another island. —

p. 175. 28 short eared owls were counted in a field where there was great swarm of mice. — |

165 May 29<sup>th</sup>. — Henslow says that he has not the slightest doubt that *Festuca vivipara* is the same species with *F. ovina* & was rendered viviparous by growing in height. — yet he has seen it propagated in a garden, which is case precisely analogous to the Canada onion mentioned in Hort. Transact. *Aisa caespitosa* become viviparous on mountain & yet can be raised in gardens. — *Poa alpina*, though generally viviparous sometimes seeds. There are endless curious facts about every part of plant producing buds, so that Turpin<sup>52</sup> says each cell of plant is individual. — Most plants which propagate rapidly by buds, layers &c. &c. do not seed freely. — The periwinkle seldom produces seeds, because it is thought to require insects to impregnate it. — it is allied to *Asclepia*, where this is always the case according to Brown. — |

166 Voyage of Adventure & Beagle.<sup>53</sup> Vol. I. p. 306 *Shells* as well as plants of Juan Fernandez differ from American coast. Vol. II p. 251 about the drifting of animals on ice — p. 643 — very curious table of all the castes from Stephenson at Lima.

The same numerical relation (both in species and subgenera) between the Crag & Touraine beds, the one with neighbouring & Arctic sea, & the other with neighbouring & Senegal in sea — is remarkable. — Again the resemblance between the Superga  
 167 & Paris, numerically | the same with recent & yet almost wholly different, is same, as if Isthmus of Panama. — Those two cases highly improbable — yet I can see no other way of accounting for them. — Think over this — The Superga beds have many shells in common with Touraine & are not far distant, which as L. says is strong argument for their contemporariness. — How is this with the Eocene beds. — see Lyells<sup>54</sup> tables —

Bennetts Wanderings<sup>55</sup> Vol. II p. 155. By inference I imagine that there are Baboons in St. Thomas on W. coast of Africa. |

168 Owen<sup>56</sup> Linn. Soc. April 2<sup>d</sup> 1839. The *Lepidosiren*. — *Amblyrhynchus* & *Toxodon*, all equally aberrant — the two former connecting classes like *Toxodon* in orders. — Fish & reptiles in former case — Reptiles & Birds & Mamm. in *Amblyrhynchus* — is not this right? —

<sup>52</sup> Pierre-Jean-François Turpin, *Organographie microscopique des végétaux. Sur l'origine du tissu cellulaire*, Paris, 1829.

<sup>53</sup> Robert FitzRoy, *Narrative of Voyages of H.M.S. Adventure and Beagle*, London, 1839.

<sup>54</sup> Sir Charles Lyell, *Principles of Geology*, vol. 3, London, 1833, Table II, pp. 389–393.

<sup>55</sup> George Bennett, *Wanderings in New South Wales*, London, 1834.

<sup>56</sup> Richard Owen, "Description of the *Lepidosiren annectens*", *Trans. Linn. Soc. London*, vol. 18. 1841, p. 327; read 2 April 1839.

June 18<sup>th</sup>. Eyton<sup>57</sup> tells me that Yarrell<sup>58</sup> knows of a Gull which has laid in domestication eggs of two shapes & colour — Eyton has observed same thing in  
 169 *Brent Goose* | Eyton says some of the pigeons in common Dovecot are very like a Himalaya species — *leuconotes*. —

Magazine of Nat. History 1839 p. 106. Waterhouse<sup>59</sup> refers to fossil remains of the Hamster. — is not this Siberian animal? —

Eyton<sup>60</sup> says that the young of two hatches all alike between the male Chinese & female common goose took after the common goose thus contradicting (probably) Yarrell's<sup>61</sup> law & Walkers<sup>62</sup> of the male giving form — they interbred & the young kept constant & all alike |

170 Waterhouse says some of the Galapagos Heteromera . . . [?] must come very near to Patagonian species. —

p. 18 of Temminck's<sup>63</sup> Preliminary discourse to Fauna of Japan. — that the animals of islands N. of Timor are allied to the type of genera in isles de Sonda as well by those which are identical, as those which are different — now this is same as Galapagos facts &c. &c. — & it shows the cause which gives same species to different isl<sup>d</sup>. is the same as that which gives genera. — now in case of large |

173 Mr. Greenough<sup>64</sup> on his map of the world has written Mastodon found at Timor — thinks he has seen specimen in Paris Museum. —

Athenaeum 1839 p. 451. Sheep Merinos from Cape of Good Hope have different constitution from those of Europe<sup>65</sup> — for they stand India better than the latter. —

Forrest Voyage<sup>66</sup> p. 323. Sooloo imported elephant. wild hogs — spotted deer. no loories, but cocatores & small green parrots. |

174 June 26<sup>th</sup> — Yarrell: — Black Swan in domestication & nature strictly monogamous — geese polygamous (?when wild) but even some birds are so when wild — wild ducks monogamous; tame ones highly polygamous — change of instinct by domestication. —

"Notices of the Indian Archipelago" Published at Singapore in 1837. by Mr. J. H. Moore. — p. 1 Elephant Rhinoceros Leopard (but not Royal Tiger) &c. are found but only in one part the northern peninsula of Borneo. — Ox & hog natives of Borneo. |

<sup>57</sup> Thomas Campbell Eyton.

<sup>58</sup> William Yarrell.

<sup>59</sup> George Robert Waterhouse, "Observations on the Rodentia", *Magazine of Natural History*, vol. 3, 1839, p. 106.

<sup>60</sup> Thomas Campbell Eyton, "Some remarks upon the Theory of Hybridity", *Magazine of Natural History*, vol. 1, 1837, p. 357.

<sup>61</sup> See "Darwin's Fourth Notebook on Transmutation of Species", *Bull. Brit. Mus. (Nat. Hist.)*, Historical Series, vol. 2, 1960, p. 173, footnote 1.

<sup>62</sup> Alexander Walker, *Intermarriage*, London, 1838.

<sup>63</sup> Coenraad Jacob Temminck, "Aperçu général . . . sur les Mammifères qui habitent le Japon . . .", in P. F. von Siebold, *Fauna Japonica*, Leiden, 1833.

<sup>64</sup> George Bellas Greenough.

<sup>65</sup> *Athenaeum*, 1839, p. 451: "Asiatic Society . . . Agricultural and Horticultural Society of Bombay, in reply to a request for information respecting the breeds of cattle used in the Presidency. . . . Sheep are rare . . . Experiments are now making to improve the breed. . . . The merino from the Cape is found to answer much better than that brought from England".

<sup>66</sup> Thomas Forrest, *A Voyage to New Guinea, and the Moluccas, from Balmabangan*, London 1779; p. 323: "At Sooloo are none of those beautiful birds called Loories; but there is an abundance of diminutive cocatores, and small green parrots . . . Here are wild elephants, the offspring, doubtless, of those sent in former days from the continent of India, as presents to the kings of Sooloo . . . Sooloo has spotted deer".

- 175 Notices of Indian Arch. Singapore 1837 by J.H. ? J. H. Moore do p. 189, 190. No full sized horse is found East of y Bussamporter & S. of Tropic — after quitting Bengal the fact is noticed in Cassay Ava Pegue seldom equal 13 hands — those of Lao & Siam inferior to those of Pegu — in Sumatra they breed both small — Java pony occasionally reaches 13 hands. — Philippine Pony somewhat resembles that of Celebes is somewhat larger than the Sambawa Java & Sumatra breeds. (Here it appears there are shades of difference in all the isl<sup>d</sup>. like in wild animals). — There are prevailing colours in the different islands. — The horse is only found wild in the plains of Celebes. (but language shows that probably not original there) — shows them isl<sup>d</sup> not fit for horse. Forrest<sup>67</sup> (p. 270) says many wild horses, bullocks, & deer
- 176 South part of Mindanao. — | do. Appendix p. 43, 45. the *Breed* of elephants in little isl<sup>d</sup> of Sooloo. — said to have been imported : shows they will propagate get dimensions. — do. App. p. 73 State of Muar in Malacca — speaks of Rhinoceros as well as *Tapir*. —

Journal of Asiatic Soc. Vol. V. p. 565 in a paper by Lieut. Newbold.<sup>68</sup> — A Malayan albino described "To this day the tomb of his grandfather, who was also an albino is held sacred by the credulous natives, & vow made at it. Both his parents were of the usual colour. His sister is an albino like himself said not to be common" — probably, I should think grandfather first of race & if so, fact for my theory |

181 that throughout the *Moluccas* Archipelago they are only to be found on the isl<sup>d</sup> of Batchian near S.E. end of Gilolo.

- Forrest Voyage<sup>69</sup> p. 39<sup>70</sup> — deer but no wild animals in Gilolo. — p. 134<sup>71</sup> Birds of Paradise were first produced from Gilolo. — p. 253<sup>72</sup> In isl<sup>d</sup> of Bunwoot (18 miles in circum) there are hogs and monkey near shore of Magindano |
- 182 Vol. do p. 634<sup>73</sup> alludes to the fact stated by M. Tournal that skulls found near Vienna approximate to Nigro forms ; those from Rhine to the Caribs. — Vol. II p. 650<sup>74</sup> Long attested account of fall of fish in India. — Windsor Earl. Eastern Seas p. 229<sup>75</sup>. Believes the *Tapir* found in Borneo p. 233<sup>76</sup>. There as well as all Malay countries the cats are born with the joint near the tip crooked. — is this form |

<sup>67</sup> Thomas Forrest, *ibid.*, p. 270 : "Here are many wild horses, bullocks and deer".

<sup>68</sup> J. T. Newbold, "Sketch of the State of Muar", *Journ. Asiatic Soc.*, vol. 5, 1836, pp. 561-7.

<sup>69</sup> Thomas Forrest. "A Voyage to New Guinea and the Moluccas, from Balamangan . . . London, 1779.

<sup>70</sup> *ibid* on p. 39 " . . . The island Gilolo abounds with bullocks and buffalos, goats and deer, also wild hogs, there are but few sheep, and no wild beasts. . . ."

<sup>71</sup> *ibid* on p. 134 " . . . the Portuguese first found these birds on the island of Gilolo, the Papua Islands, and on New Guinea ; and where they are known by the name of passaros da sol, i.e. birds of the sun . . ."

<sup>72</sup> *ibid* on p. 253 " . . . Saw a number of wild hogs . . ."

<sup>73</sup> *Journal of the Asiatic Society* vol. 2, Calcutta 1833. "Occurrence of the Bones of Man in the Fossil State" by [James] P[rinsep] p. 634 " . . . M. Tournal and other French naturalists, further suppose that several races of men have successively had possession of our continents. The form of the skulls found at Vienna is stated to approach to the African or Negro type. Those discovered in the fluviatile marls of the valley of the Rhine and Danube exhibit a close resemblance to the heads of the Karibs of those of the ancient inhabitants of Peru and Chili. . . ."

<sup>74</sup> *ibid* p. 650 Miscellaneous : "5. — Fall of Fish from the Sky".

<sup>75</sup> George Windsor Earl. "The Eastern Seas, or Voyages and Adventures in the Indian Archipelago, in 1832-33-34 . . ." London, 1837. On p. 229 " . . . and an animal, which, from the description given, must have been a *tapir*. . . ."

<sup>76</sup> *ibid*. p. 233 " . . . Here, as in all Malay countries, I noticed a peculiarity in the cats, which I never heard satisfactorily accounted for. The joints near the tip of the tail are generally crooked, as if they had been broken. I was at first inclined to doubt that they were born thus, but was afterwards convinced that such was the case. . . ."

